

**ONKYO SERVICE MANUAL****QUARTZ SYNTHESIZED  
TUNER AMPLIFIER  
MODEL TX-901  
MODEL TX-903****Black and Silver models**

BHMD, BHMDN	120V AC, 60Hz
BHMP, BHMPF, MP, MPF	230V AC, 50Hz
BHMW	120V or 220V AC, 50/60Hz
BHMQA	240V AC, 50Hz

**ONKYO  
AUDIO COMPONENTS**

# SPECIFICATIONS

## AMPLIFIER SECTION

### Power Output:

## TX-903

## TX-901

45 watts per channel, min. RMS, at 8 ohms, both channels driven, from 40Hz to 20kHz, with no more than 0.3% THD.

2 X 80 watts at 4 ohms

2 X 60 watts at 8 ohms

2 X 60 watts at 4 ohms, 1kHz (DIN)

2 X 50 watts at 8 ohms, 1kHz (DIN)

0.3% at rated power

0.1% at 30 watt output

0.3% at rated power

0.1% at 30 watt output

50 at 8 ohms

20 — 30,000 Hz ± 1dB

20 — 20,000 Hz ± 0.8dB

Phono: 2.5mV/50 kohms

CD/Tape Play: 150mV/50 kohms

Tape Rec: 150mV/3.5 kohms

120mV RMS at 1kHz, 0.2% THD

Phono: 80dB (at 5mV input, IHF-A)

CD/Tape: 100dB (IHF-A)

Bass: ± 10dB at 100Hz

Treble: ± 10dB at 10kHz

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### Dynamic Power Output:

2 X 100 watts at 4 ohms

2 X 75 watts at 8 ohms

### Continuous Power Output:

2 X 80 watts at 4 ohms, 1kHz (DIN)

### Total Harmonic Distortion:

0.2% at rated power

### IM Distortion:

0.1% at 30 watt output

### Damping Factor:

0.2% at rated power

### Frequency Response:

0.1% at 30 watt output

### RIAA Deviation:

50 at 8 ohms

### Sensitivity and Impedance:

20 — 30,000 Hz ± 1dB

### Phone Overload:

20 — 20,000 Hz ± 0.8dB

### Signal-to-Noise Ratio:

Phono: 2.5mV/50 kohms

### Tone Controls:

CD/Tape Play: 150mV/50 kohms

### Muting:

Tape Rec: 150mV/3.5 kohms

### LOUDNESS (-30dB):

120mV RMS at 1kHz, 0.2% THD

Phone: 80dB (at 5mV input, IHF-A)

CD/Tape: 100dB (IHF-A)

Bass: ± 10dB at 100Hz

Treble: ± 10dB at 10kHz

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**Remote control transmitter RC-2238 (Only Model TX-903)**  
**Transmitter:** Infrared  
**Signal range:** Approx. 5 meters (16ft. X 4")  
**Power supply:** Two "AA" batteries(1.5V X 2)

Specifications and features are subject to change without notice.

## SERVICE PROCEDURES

### 1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

Circuit No.	Part No.	Description	Model	Type
F901	252049	4A(ST-6),Primary	TX-901	MD/MW
F901	252050	5A(ST-6),Primary	TX-903	MD/MW
F902	252074	2A-SE-EAK,Primary	TX-901	MP/MW/MQ
F902	252075	2.5A-SE-EAK,Primary	TX-903	MP/MW/MQ
F951	252074	2A-SE-EAK,AC outlet	TX-903	MP/MQ

### 2. Safety-check out

(Only U.S.A. model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer.

Connect the insulating-resistance tester between the plug of power supply cord and nickel screw on the back panel.

Specifications: 3.3Mohm  $\pm 10\%$  at 500V.

### 3. Change of voltage

Worldwide models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

### 4. Step band selector switch

Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 50kHz (FM) and 9kHz (AM) at the factory, but may have to be reset to 100kHz and 10kHz depending on the area where the unit is used.

De-emphasis	FM step	AM step
Europe: 50 $\mu$ sec	50kHz	9kHz
U.S.A.: 75 $\mu$ sec	200kHz	10kHz

### 5. Changing the band step

With the exception of the models below, a BAND STEP selector switch is not provided.

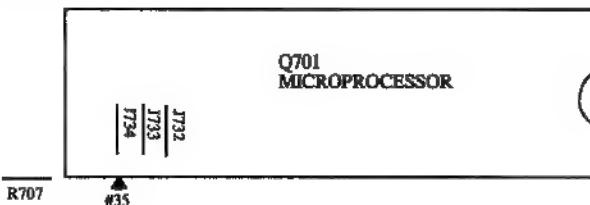
(FM)

MODEL	BAND STEP	R707(10k $\Omega$ )	J734
UD	200kHz $\rightarrow$ 50kHz	Add	Cut
UP/UQ	50kHz $\rightarrow$ 200kHz		Shorted

(AM)

MODEL	BAND STEP	R709(10k $\Omega$ )	J732
UD	10kHz $\rightarrow$ 9kHz		Shorted
UP/UQ	9kHz $\rightarrow$ 10kHz	Add	Cut

Refer to the page 23.



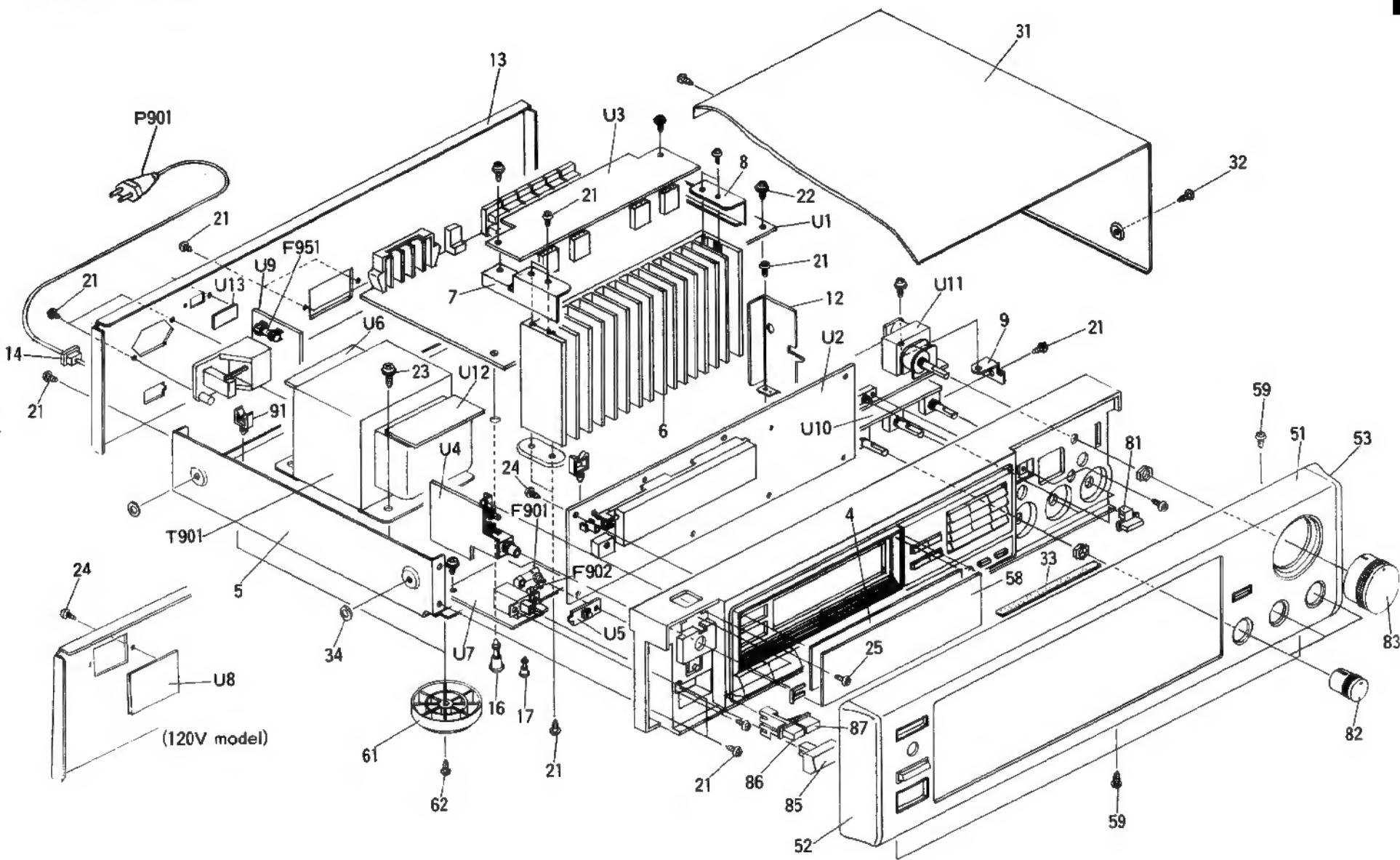
DISPLAY CIRCUIT PC BOARD

### 6. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory, the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

## **EXPLODED VIEW**

## MODEL TX-903



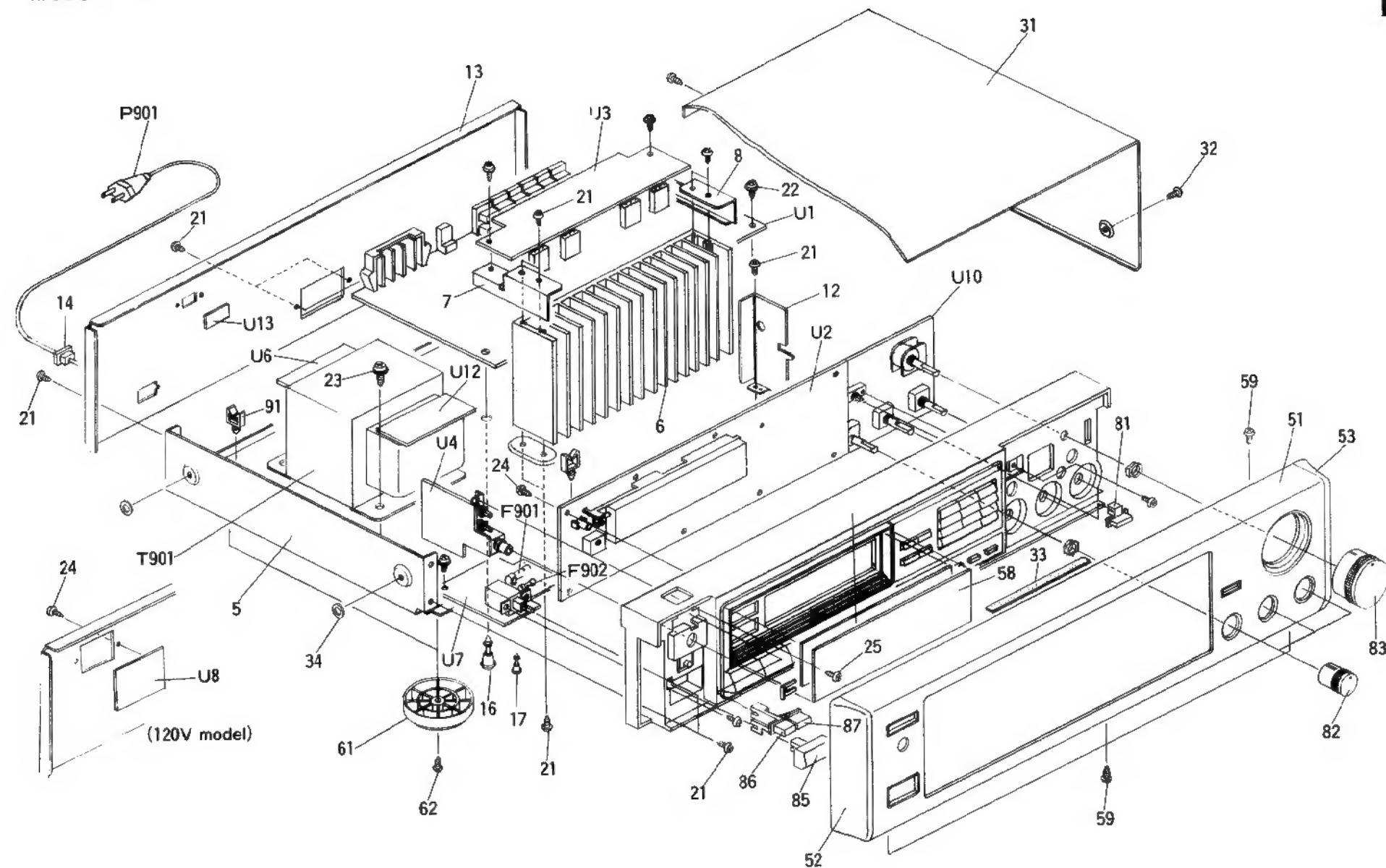
# PARTS LIST

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
1	27110680Y	Front bracket <B>	85	28324140	Knob POW <B>	U3	1A331527-1	NAAF-4327-1,Power amplifier circuit pc board ass'y <D>
	27110681Y	Front bracket <S>		28324184	Knob POW <S>		1A331527-1A	NAAF-4327-1A,Power amplifier circuit pc board ass'y <P/W/Q>
4	28133254Y	Back plate	86	28324170Y	Knob SP A <B>		1A331528-1	NASW-4328-1,Headphone terminal pc board ass'y <D>
5	27100228Y	Chassis		28324172Y	Knob SP A <S>	U4	1A331528-1A	NASW-4328-1A,Headphone terminal pc board ass'y <P/W/Q>
6	27160293Y	Radiator	87	28324171Y	Knob SP II <B>			
7	27141441Y	Bracket LH		28324173Y	Knob SP B <S>			
8	27141442Y	Bracket RH	91	27300833	WS-2NS,Clamp		1A331528-1A	NASW-4328-1A,Headphone terminal pc board ass'y <P/W/Q>
9	27141443Y	Bracket PC	P901	252050	▲ 5A(ST-6),Fuse <D/W>			
12	27130643AY	Bracket,shield	P902	252075	▲ 2.5A-SE-EAK,Fuse <P/W/Q>	U5	1A331529-1	NASW-4329-1,Power switch pc board ass'y
13	27121535Y	Back panel <D>	P951	252074	▲ 2A-SE-EAK,Fuse <P/Q>			
	27121535-1Y	Back panel <P>	P901	253163Y or	▲ AS-UC-6 #18,	U6	1A331530-1	NAETC-4330-1,Terminal pc board ass'y
	27121535-3Y	Back panel <W>		253174Y	▲ Power supply cord <D>	U7	1A331531-1	NAPS-4331-1,Power supply circuit pc board ass'y <D>
	27121535-4Y	Back panel <Q>		253164Y or	▲ AS-CBE,			
14	27300750	▲ Bushing		253175Y	Power supply cord <P/W>		1A331531-1A	NAPS-4331-1A,Power supply circuit pc board ass'y <P>
16	27190524	KGLS-14R,Holder		253170	▲ AS-SAA,Power supply cord <Q>			
17	27190266	KGLS-12R,Holder	P951	25050346	▲ NSCT-2P173,AC outlet <Q>	1A331531-1B	NAPS-4331-1B,Power supply circuit pc board ass'y <W>	
21	834430088	3TTS+8B(BC),Self-tapping screw	Q503,Q504	2202282,	2SA1265N-R,			
22	831130088	3TTW+8B,Self-tapping screw		2202283,	2SA1265N-O,	1A331531-1C	NAPS-4331-1C,Power supply circuit pc board ass'y <Q>	
23	830440089	4TTC+8C(BC),Self-tapping screw		2201693,	2SA1491-O,			
24	833430080	3TTP+8P(BC),Self-tapping screw		2201694 or	2SA1491-Y or	U8	1A331532-1	NAETC-4332-1,AC outlet pc board ass'y <D>
25	82143006	3P+6FN(BC),Pan head screw		2201696	2SA1491-P,Power amplifier transistor			
26	801433	3SMS10W.SW+14B(BC),Sems self-tapping screw	Q505,Q506	2202292,	2SC3182N-R,	U9	1A331533-1	NAETC-4333-1,AC outlet pc board ass'y <P>
				2202293,	2SC3182N-O,			
31	28184471AY	Top cover		2201703,	2SC3855-O,	1A331533-1A	NAETC-4333-1A,AC outlet pc board ass'y <W>	
32	834430088	3TTS+8B(BC),Self-tapping screw		2201704 or	2SC3855-Y or			
33	28140680	0.5×180×8,Cushion		2201706	2SC3855-P,Power amplifier transistor	U10	1A331534-1	NAAF-4334-1,Tone control circuit pc board ass'y <D>
34	27270212	Spacer <P/W/Q>	T901	2300753AY	▲ NPT-1129D,Power transformer <D>			
51	1A331701K	Front panel ass'y <B>		2300754Y	▲ NPT-1129P,Power transformer <P>	1A331534-1A	NAAF-4334-1A,Tone control circuit pc board ass'y <P/W/Q>	
	1A332701K	Front panel ass'y <S>		2300755Y	▲ NPT-1129DG,Power transformer <W>			
52	28125226BY	End cap L		2300756Y	▲ NPT-1129Q,Power transformer <Q>	U11	1A331535-1	NAETC-4335-1,Volume control pc board ass'y
53	28125227BY	End cap R	U1	1A331525-1	NARP-4325-1,Tuner circuit pc board ass'y <D>			
58	28191617Y	Clear plate		1A331525-1A	NARP-4325-1A,Tuner circuit pc board ass'y <P/Q>	U12	1A331537-1	NAETC-4337-1,Terminal pc board ass'y
59	833430080	3TTP+8P(BC),Self-tapping screw		1A331525-1B	NARP-4325-1B,Tuner circuit pc board ass'y <W>	U13	1A331538-1	NASW-4338-1,Voltage selector switch pc board ass'y <W>
60	28135199	Badge						
61	27175254	Leg		1A331525-1B	NARP-4325-1B,Tuner circuit pc board ass'y <W>			
62	834430088	3TTS+8B(BC),Self-tapping screw		U2	1A331526-1	NADIS-4326-1,Display circuit pc board ass'y <D>		
71	25060044	Terminal GND		1A331526-1A	NADIS-4326-1A,Display circuit pc board ass'y <D>			
81	28324162Y	Knob LOUD <B>		1A331526-1A	NADIS-4326-1A,Display circuit pc board ass'y <P/Q>			
	28324177Y	Knob LOUD <S>		1A331526-1B	NADIS-4326-1B,Display circuit pc board ass'y <W>			
82	28324150-1Y	Knob LEV <B>						
	28324151	Knob LEV <S>						
83	28324163	Knob VOL <B>						
	28324182	Knob VOL <S>						

NOTE: THE COMPONENTS IDENTIFIED BY MARK ▲ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

## EXPLODED VIEW

MODEL TX-901



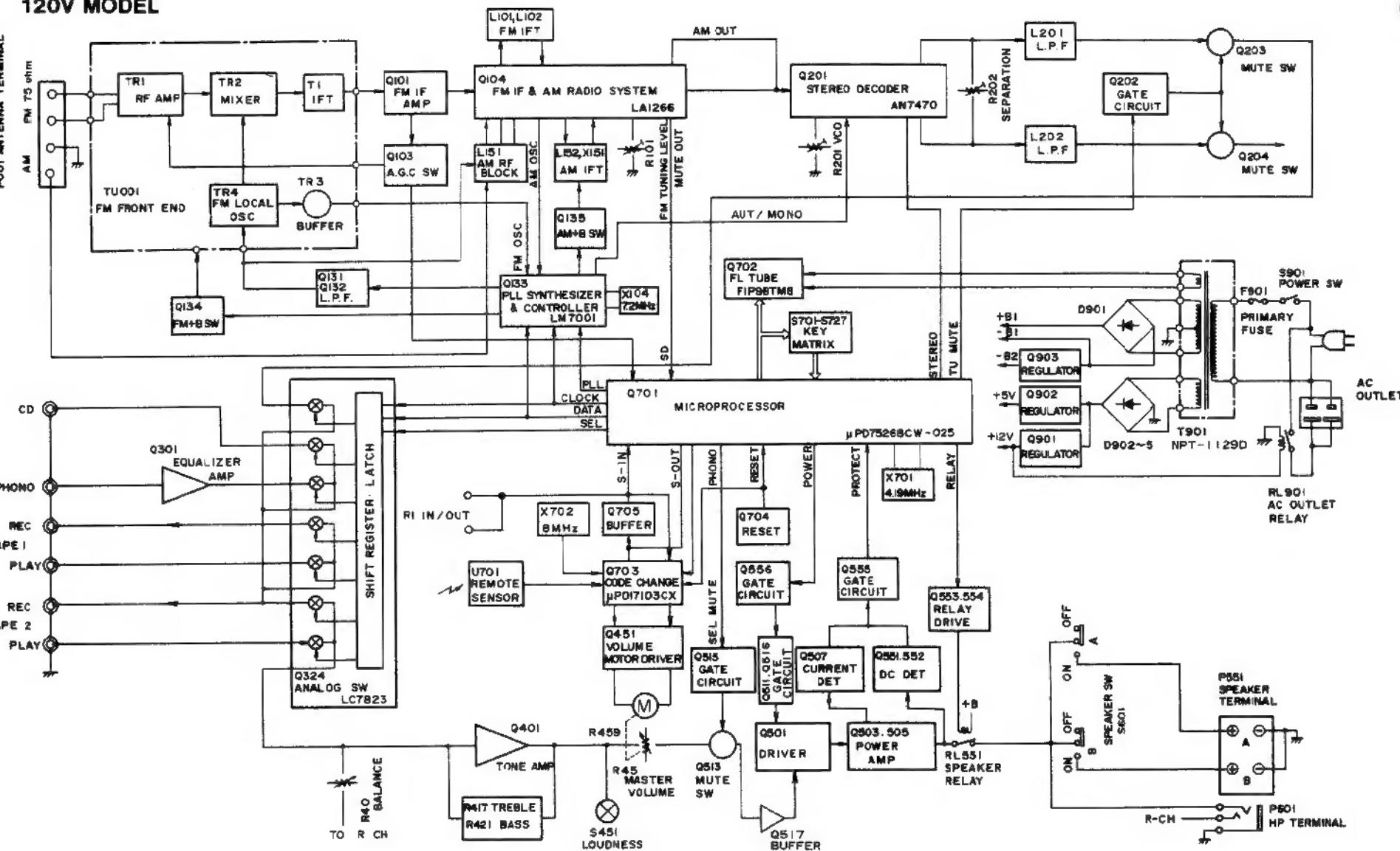
# PARTS LIST

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
1	27110680Y	Front bracket <B>	85	28324140	Knob POW <B>	U4	1A335528-2	NASW-4328-2,Headphone terminal pc board ass'y <D>
	27110681Y	Front bracket <S>		28324184	Knob POW <S>		1A335528-2A	NASW-4328-2A,Headphone terminal pc board ass'y <P/W/Q>
4	28133255Y	Back plate	86	28324170Y	Knob SP A <B>		1A335530-2	NAETC-4330-2,Terminal pc board ass'y <D>
5	27100228Y	Chassis		28324172Y	Knob SP A <S>		1A335531-2	NAPS-4331-2,Power supply circuit pc board ass'y <P>
6	27160290Y or 27160272AY	Radiator	87	28324171Y	Knob SP B <B>		1A335531-2B	NAPS-4331-2B,Power supply circuit pc board ass'y <W>
				28324173Y	Knob SP B <S>		1A335531-2C	NAPS-4331-2C,Power supply circuit pc board ass'y <Q>
7	27141441Y	Bracket LH	91	27300833	WS-2NS,Clamp		1A335536-1	NAAF-4336-1,Tone control circuit pc board ass'y <D>
8	27141442Y	Bracket RH	P901	252049	▲ 4A(ST-6),Fuse <D/W>		1A335536-1A	NAAF-4336-1A,Tone control circuit pc board ass'y <P/W/Q>
12	27130643AY	Bracket,shield	P902	252074	▲ 2A-SB-EAK,Fuse <P/W/Q>		1A335537-2	NAETC-4337-2,Terminal pc board ass'y <W>
13	27121536Y	Back panel <D>	P901	253163Y or 253174Y or 253164Y or 253175Y	▲ AS-UC-6 #18, ▲ Power supply cord <D> ▲ AS-CEE, Power supply cord <P/W>		1A335537-2B	NASW-4338-2,Voltage selector switch pc board ass'y <W>
	27121536-1Y	Back panel <P>					1A335537-2C	
	27121536-3Y	Back panel <W>						
	27121536-4Y	Back panel <Q>						
14	27300750	▲ Bushing		253170	▲ AS-SAA,Power supply cord <Q>	U10	1A335536-1	NAAF-4336-1,Tone control circuit pc board ass'y <D>
16	27190524	KGLS-14R,Holder	Q503,Q504	2202492, 2202493, 2202493, 2202244 or 2202246	2SA1264N-R, 2SA1264N-O, 2SA1694-O, 2SA1694-Y or 2SA1694-P,Power amplifier transistor		1A335536-1A	NAAF-4336-1A,Tone control circuit pc board ass'y <P/W/Q>
17	27190266	KGLS-12R,Holder					1A335537-2	NAETC-4337-2,Terminal pc board ass'y <W>
21	834430088	3TTS+8B(BC),Self-tapping screw					1A335538-2	NASW-4338-2,Voltage selector switch pc board ass'y <W>
22	831130088	3TTW+8B,Self-tapping screw						
23	830440089	4TTC+8C(BC),Self-tapping screw						
24	833430080	3TTP+8P(BC),Self-tapping screw	Q505,Q506	2202502, 2202503, 2202253, 2202254 or	2SC3181N-R, 2SC3181N-O, 2SC4467-O, 2SC4467-Y or 2SC4467-P,Power amplifier transistor			
25	82143006	3P+6FN(BC),Pan head screw						
26	801433	3SMS10W.SW+14B(BC),Sems self-tapping screw						
31	28184471AY	Top cover		2202256	2SC4467-P,Power amplifier transistor			
32	834430088	3TTS+8B(BC),Self-tapping screw	T901	2300757Y	▲ NPT-1130D,Power transformer <D>			
33	28140680	0.5×180×8,Cushion		2300758Y	▲ NPT-1130P,Power transformer <P>			
34	27270212	Spacer <P/W/Q>		2300759Y	▲ NPT-1130DG,Power transformer <W>			
51	1A335701K	Front panel ass'y <B>		2300760Y	▲ NPT-1130Q,Power transformer <Q>			
	1A336701K	Front panel ass'y <S>	U1	1A335525-2	NARF-4325-2,Tuner circuit pc board ass'y <D>			
52	28125226BY	End cap L						
53	28125227BY	End cap R		1A335525-2A	NARF-4325-2A,Tuner circuit pc board ass'y <P/Q>			
58	28191617Y	Clear plate						
59	833430080	3TTP+8P(BC),Self-tapping screw		1A335525-2B	NARF-4325-2B,Tuner circuit pc board ass'y <W>			
60	28135199	Badge						
61	27175254	Leg	U2	1A335526-2	NADIS-4326-2,Display circuit pc board ass'y <D>			
62	834430088	3TTS+8B(BC),Self-tapping screw		1A335526-2A	NADIS-4326-2A,Display circuit pc board ass'y <P/Q>			
71	25060044	Terminal GND		1A335526-2A	NADIS-4326-2B,Display circuit pc board ass'y <W>			
81	28324162Y	Knob LOUD <B>		1A335526-2B	NADIS-4326-2B,Display circuit pc board ass'y <D>			
	28324177Y	Knob LOUD <S>						
82	28324150-1Y	Knob LEV <B>	U3	1A335527-2	NAAF-4327-2,Power amplifier circuit pc board ass'y <D>			
	28324151	Knob LEV <S>						
83	28324181	Knob VOL <B>		1A335527-2A	NAAF-4327-2A,Power amplifier circuit pc board ass'y <P/W/Q>			
	28324182	Knob VOL <S>						

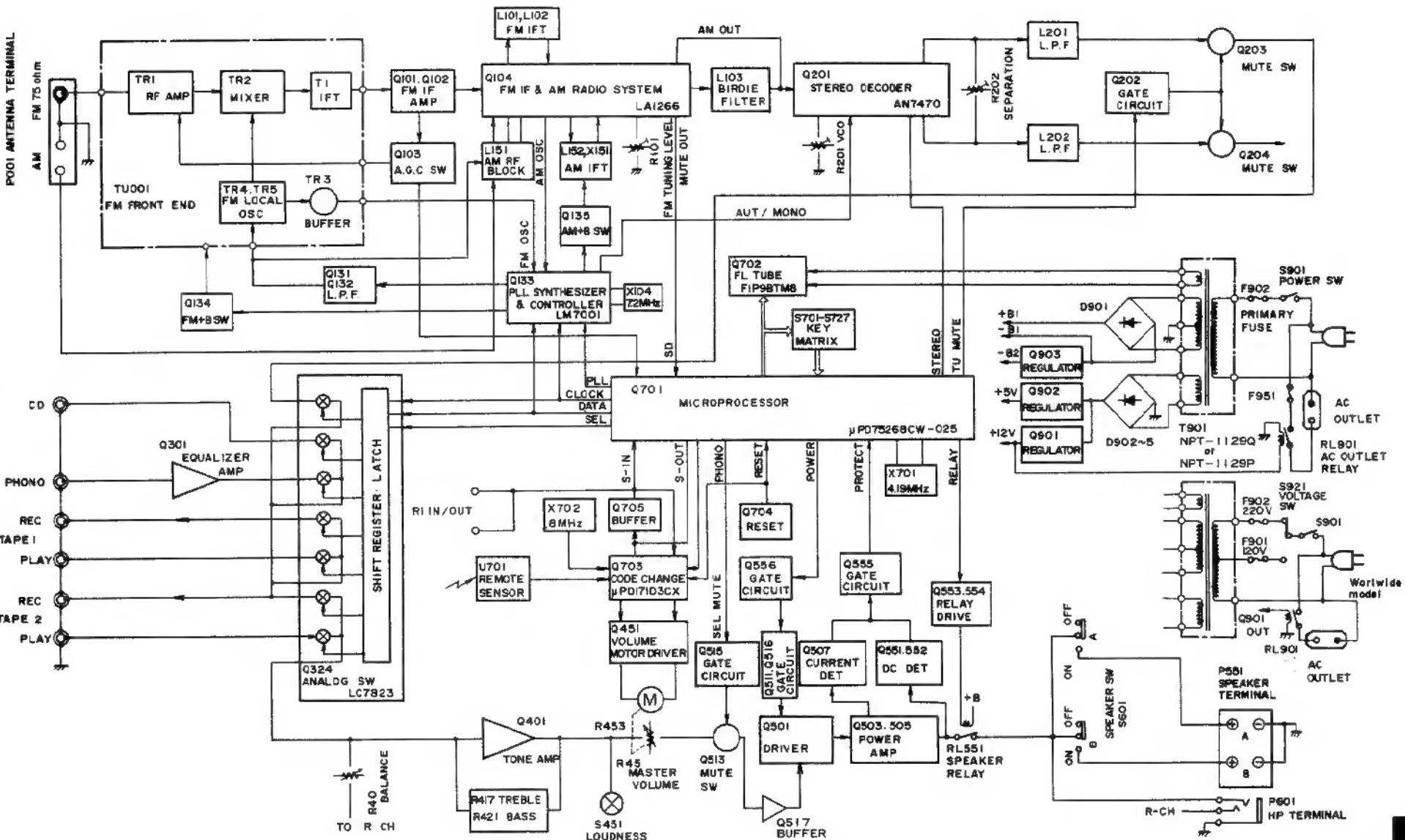
NOTE: <B>:Black model only  
<S>:Silver model only  
<D>:120V model only  
<P>:230V model only  
<W>:Worldwide model only  
<Q>:240V model only

NOTE: THE COMPONENTS IDENTIFIED BY MARK ▲ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

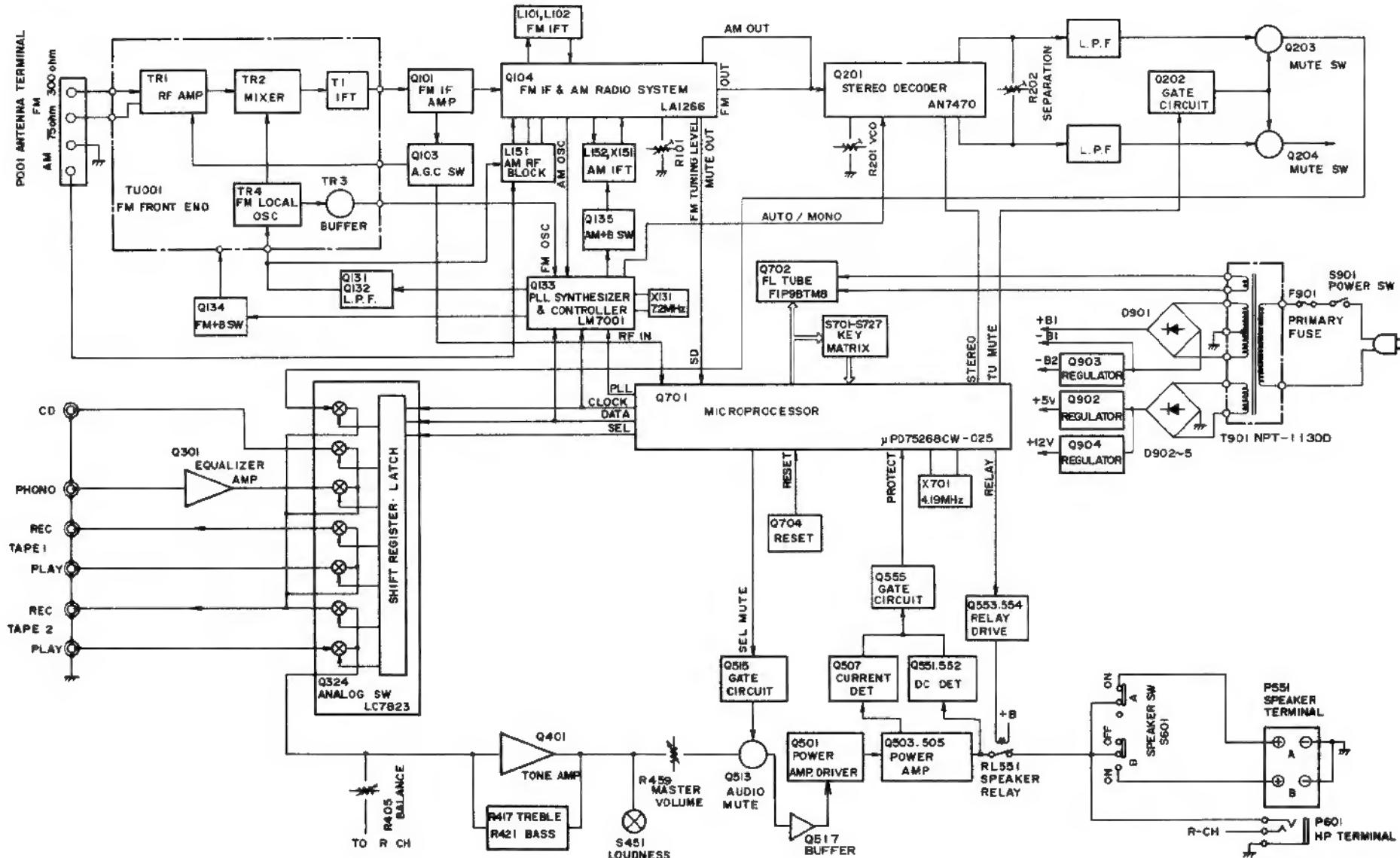
## BLOCK DIAGRAM

MODEL TX-903  
120V MODEL

## OTHER MODELS

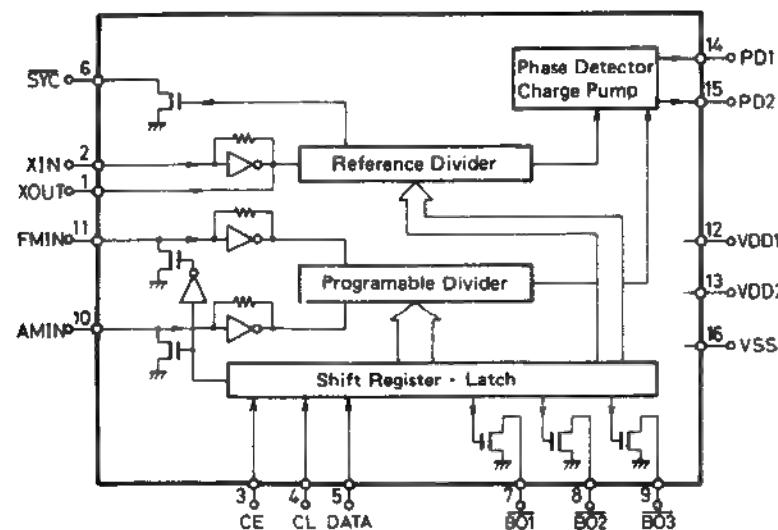


## BLOCK DIAGRAM

MODEL TX-901  
120V MODEL

# IC BLOCK DIAGRAM AND DESCRIPTION

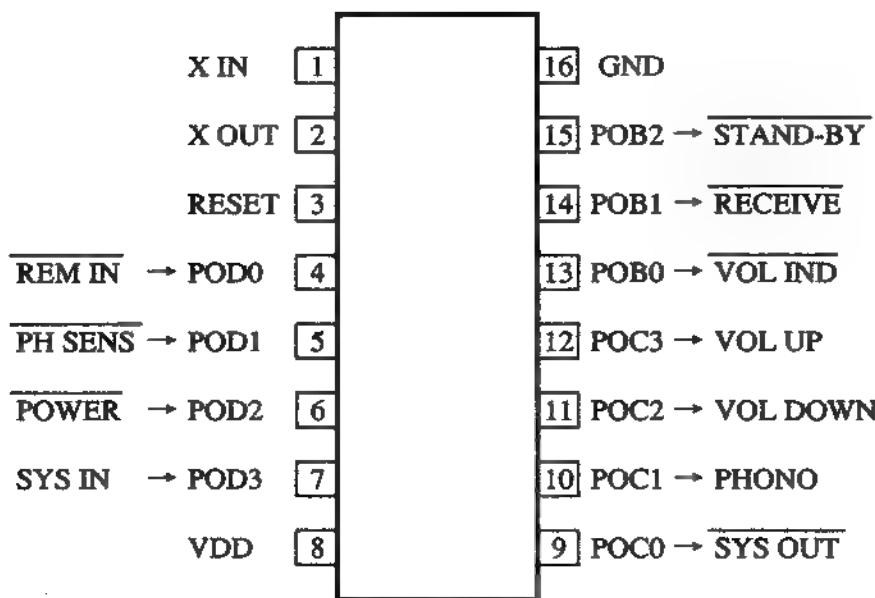
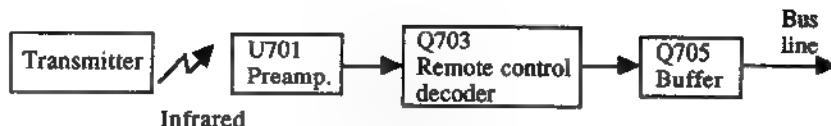
LM7001(PLL synthesizer and controller)



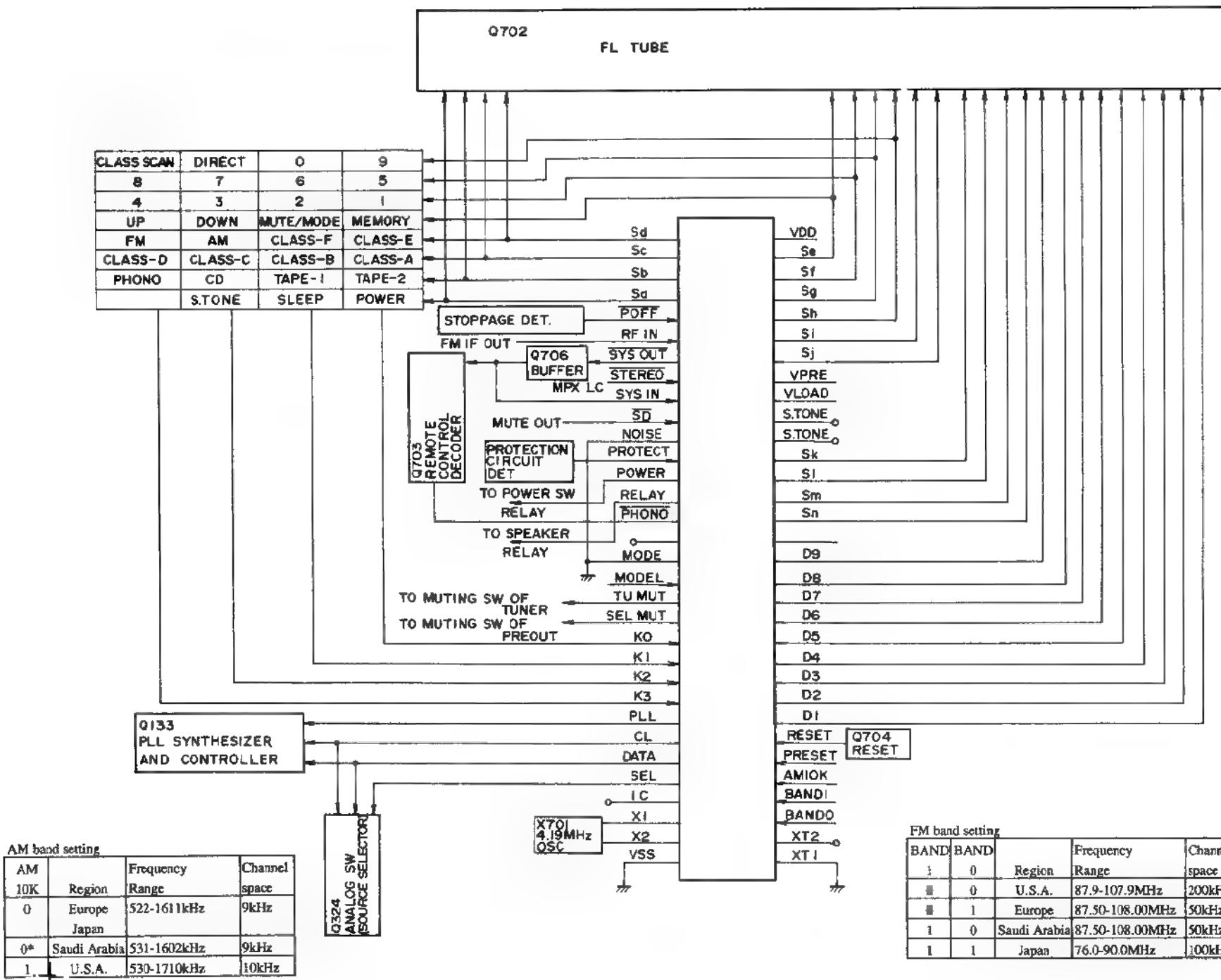
Pin No.	Terminal	Description
1	XOUT	Connect to the 7.2 MHz crystal oscillator.
2	XIN	
3	CE	Chip enable terminal. Connect to the PLL terminal of micro processor.
4	CL	Serial clock input terminal. Connect to the CLOCK terminal of micro processor.
5	DATA	Serial data input terminal. Connect to the DATA terminal of micro processor.
6	SYN	Not used.
7	AUTO/MONO	Auto/Mono control output terminal. "H" when Auto.
8	BO2	FM control signal output terminal. "L" when FM.
9	BO3	AM control signal output terminal. "L" when AM.
10	AMIN	AM local oscillator input terminal.
11	FMIN	FM local oscillator terminal.
12	VDD1	Power supply terminal for back-up.
13	VDD2	Power supply terminal.
14	PD1	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided local oscillator frequency is high than the reference frequency.
15	PD2	In the opposite case, low level is output. Floating occurs when the frequencies matched. The output is applied to the variable capacitor diode in the local oscillator through the low pass filters.
16	Vss	Ground terminal.

$\mu$ PD17103CX-528(Remote control decoder)

## MODEL TX-903



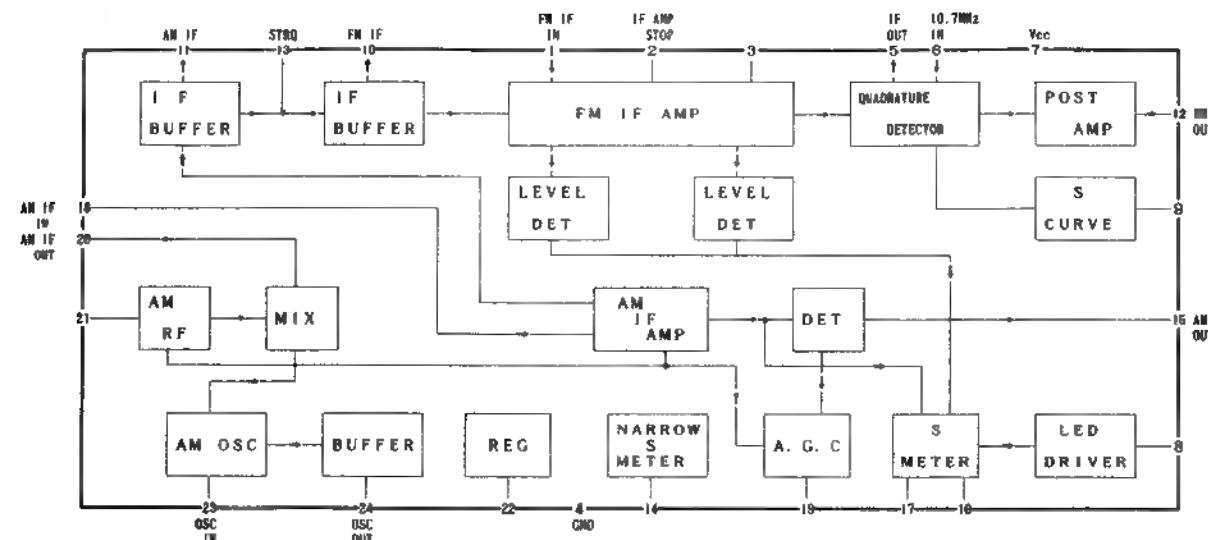
Pin No.	Symbol	Terminal	Description
1	XIN	OSC	Connect to the 8.00MHz ceramic oscillator.
2	XOUT		
3	RES	RESET	System reset terminal. Active low.
4	POD0	REMOTE IN	Signal input terminal from preamp. for remote control. Active low.
5	POD1	PHONO SENSE	Phono detection input terminal. Active low.
6	POD2	POWER	Stand-by detection input terminal. During low input, only the POWER code is decoded.
7	POD3	SYS IN	System code input terminal.
8	V <sub>DD</sub>	+B	Power supply terminal.
9	POC0	SYS OUT	Output at this terminal are the custom code (16bits) remote control code input to REMOTE IN, data code (8bits), and the serial code (12bits) that has been converted corresponding to the decoded data code (8bits)
10	POC1	PHONO	When the player PLAY/REJECT is input, a high pulse of 200ms is output.
11	POC2	VOL DOWN	When the volume DOWN code is input, a high pulse of 120ms is output.
12	POC3	VOL UP	When the volume UP code is input, a high pulse of 120ms is output.
13	POB0	VOL IND	During the output of VOLUME UP/DOWN, a pulse (T T T T = 250ms) is output. (Not used.)
14	POB1	RECEIVE	This is the display output for remote control reception. Output is low when decoded code is being received.
15	POB2	STAND-BY	STAND-BY indication terminal.
16	V <sub>SS</sub>	GND	Ground terminal.



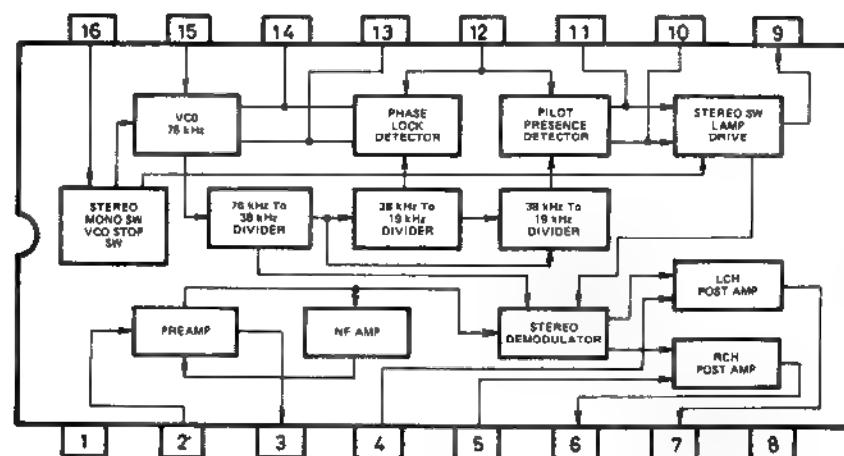
Pin No.	Symbol	Description						
1	Sd							
2	Sc	Segment and key scan output terminals. "H" when active.						
3	Sb							
4	Sa							
5	POFF	This is the input terminal for detection of the stoppage of electric current."L" when the stoppage of electric current.						
6	RF IN	RF mode input terminal. <table border="1" data-bbox="338 383 597 489"> <tr> <td>RF IN</td> <td>RF MODE</td> </tr> <tr> <td>L</td> <td>LOCAL</td> </tr> <tr> <td>H</td> <td>DX</td> </tr> </table>	RF IN	RF MODE	L	LOCAL	H	DX
RF IN	RF MODE							
L	LOCAL							
H	DX							
7	SYS OUT/ SYS EN	System code output terminal."L" when active. Initializing input terminal when the power turns on.						
8	STEREO	Stereo broadcast detection input terminal. "L" when stereo broadcast.						
9	SYS IN	System code input terminal."H" when active.						
10	SD	Broadcast detection input terminal."L" when active. Control the stop of auto tuning and output TU MUT(#19).						
11	NOISE	Noise detection input terminal.Not used.						
12	PROTECT	Protection circuit operation detection input terminal.						
13	POWER	Power control output terminal.						
14	RELAY	Speaker relay control output terminal.						
15	PHONO	Phono control output terminal.						
16		Not used.						
17	MODE	Initializing input terminal for operation mode setting.						
18	MODEL	Initializing input terminal for model setting of receiver.						
19	TU MUT	Muting output terminal."H" when active.						
20	SEL MUT	Audio muting output terminal.Not used.						
21	K0							
22	K1	Key scan input terminals. "H" when active.						
23	K2							
24	K3							
25	PLL	Connect to the terminal CE of PLL IC (LM7001 Q133).						
26	CL	Connect to the terminal CL of PLL IC and analogue switch.						
27	DATA	Connect to the terminals DATA of PLL IC and analogue switch.						
28	SEL	Analog switch control output terminal. Connect to the terminal SEL of analogue switch(LC7823 Q324)						

Pin No.	Function	Description
29	IC	Internal connected.
30	X1	Ceramic oscillator connection terminal for main system clock.
31	X2	Connect to the 4.19MHz ceramic oscillator.
32	VSS	Ground terminal.
33	XT1	Ceramic oscillator connection terminal for sub system clock.
34	XT2	Not used.
35	BAND0	Initializing input terminal for region setting of FM band.
36	BAND1	
37	AM 10K	Initializing input terminal for region setting of AM band.
38	PRESET	Initializing input terminal for operation mode setting.
39	RESET	Reset input terminal."L" when active.
40	D1	
41	D2	
42	D3	
43	D4	
44	D5	Digit output terminals."H" when active.
45	D6	
46	D7	
47	D8	
48	D9	
49		Not used.
50	Sn	
51	Sm	Segment output terminals."H" when active.
52	Sl	
53	Sk	
54	S.TONE	SELECTIVE TONE indication output terminal.Not used.
55	S.TONE	SELECTIVE TONE control output terminal.Not used.
56	VLOAD	Pull-down resistor connection terminal of FIP controller/driver.
57	VPRE	Power supply terminal of output buffer of FIP controller/driver.
58	Si	
59	Si	
60	Sh	Segment and key scan output terminals. "H" when active.
61	Sg	
62	Sf	
63	Se	
64	VDD	Power supply terminal(+5V)

## LA1266(FM IF and AM radio system)

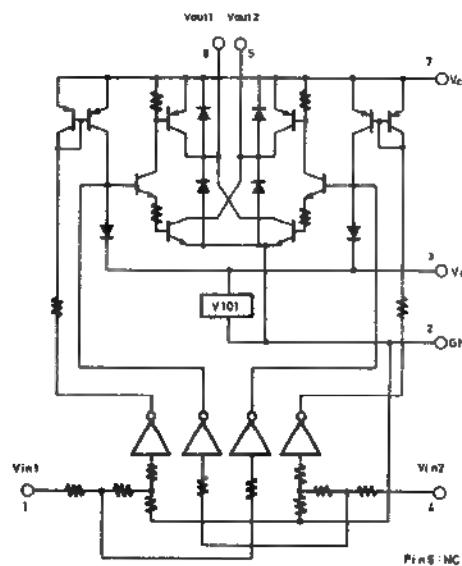


## AN7470(Stereo decoder)



## LB1630 (Motor driver)

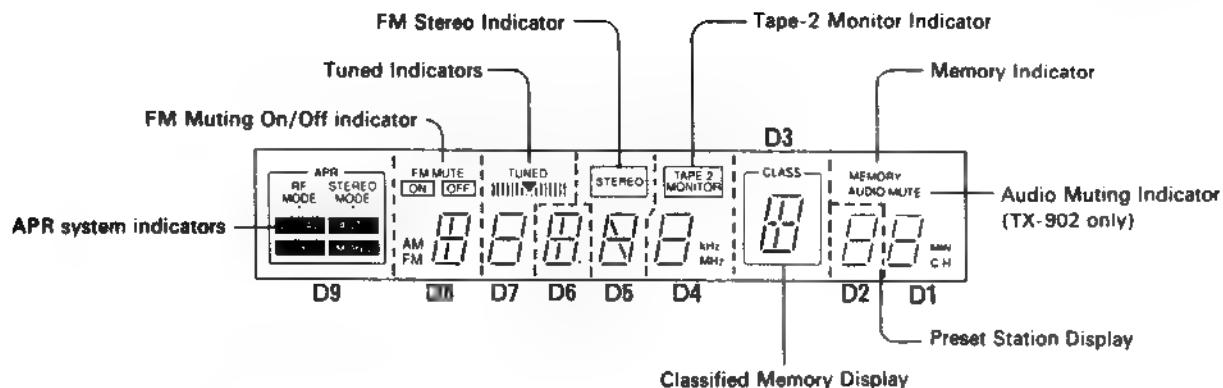
(Only Model TX-903)



## TRUTH TABLE

INT	IN2	OUT 1	OUT 2	MOTOR
H	L	H	L	Normal
L	H	L	H	Reverse
H	H	OFF	OFF	Wait
L	L	OFF	OFF	Wait

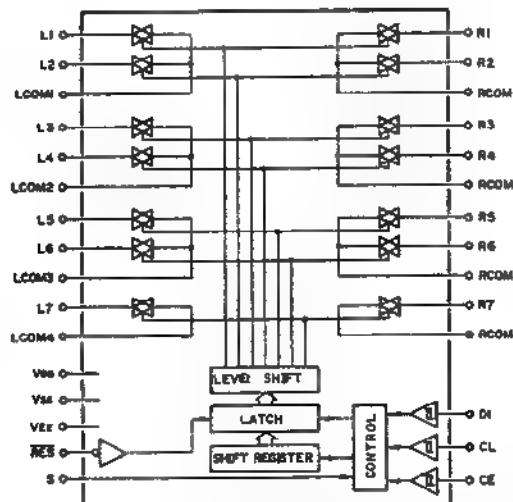
## FIP9BTM8(Fluorescent tube)



Terminal No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Electrode	F	F	NP	9G	NP	NP	NP	NP	NP	9G	NP	8G	NP	NP	8G	P(n)
Terminal No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Note: F:Filament
Electrode	7G	7G	P(m)	6G	6G	P(l)	P(k)	5G	P(j)	P(i)	4G	P(h)	NP	4G	P(g)	G:Grid
Terminal No.	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	P:Anode
Electrode	3G	P(f)	P(e)	3G	P(a)	2G	2G	P(b)	1G	P(c)	P(d)	1G	NP	F	F	NP:No pin

	D9	D8	D7	D6	D5	D4	D3	D2	D1
Sa	APR	a	a	a	a	a	a	a	a
Sb	STEREO MODE	b	b	b	b	b	b	b	b
Sc	AUTO	c	c	c	c	c	c	c	c
Sd	MONO	d	d	d	d	d	d	d	d
Se	DX	e	e	e	e	e	e	e	e
Sf	LOCAL	f	f	f	f	f	f	f	f
Sg	RF MODE	g	g	g	g	g	g	g	g
Sh					h				
Si		i		i			i		
Sj		FM MUTE	TUNED		STEREO	TAPE-2	CLASS	MEMORY	
Sk		ON	▼ (TUNED)				k		SLEEP
Sl		OFF							AUDIO MUTE
Sm		AM				kHz			MIN
Sn		FM				MHz			CH

## LC7823/LC7823N(Analog switch)



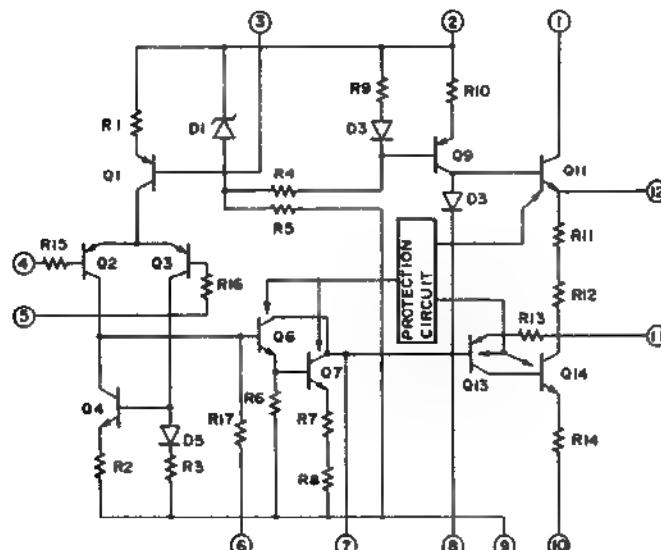
Serial Data Composition

CIRCUIT NO	PART NAME	A0	A1	A2	A3	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Q310	LC7823-N	0	1	1	1								
Q312	LC7821-N	1	1	0	1								
Q313	LC7823-N	1	1	1	1								
Q693	LC7822-N	0	0	1	1								
Q694	LC7822-N	1	0	1	1								

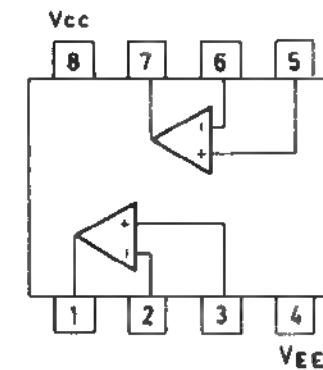
SWITCH CHANGEOVER

ADDRESS

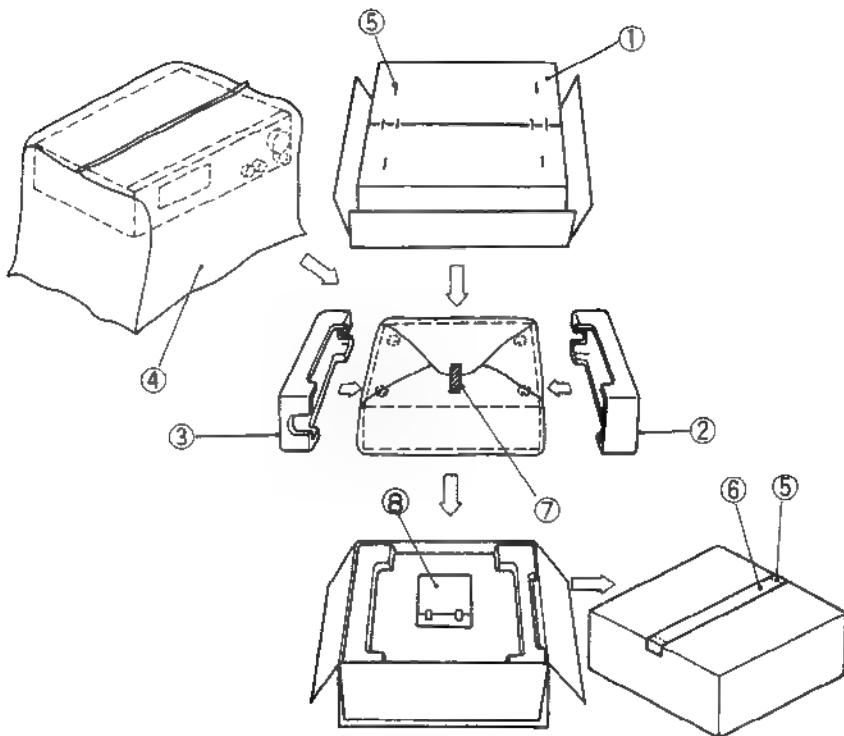
Pin No.	Terminal	Description
1,30	CD	On when the input selector is CD.
2,29	PHONO	On when the input selector is PHONO.
3,28	LCOM1,RCOM1	Common terminal.
4,27	TAPE-1 REC	Off when the input selector is TAPE-1.
5,26	TAPE-1 PB	On when the input selector is TAPE-1.
6,25	LCOM2,RCOM2	Common terminal.
7,24	TAPE-2 REC	Off when the input selector is TAPE-2.
8,23	TAPE-2 PB	On when the input selector is TAPE-2.
9,22	LCOM3,RCOM3	Common terminal.
10,21	TUNER	On when the input selector is TUNER.
11,20	LCOM4,RCOM4	Common terminal.
12	VEE	Negative power supply terminal.(-15V)
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.
15	CL	Serial clock terminal. Connect to the terminal CL of the microprocessor.
16	Vss	Ground terminal.
17	S	Select terminal.
18	RES	Reset terminal.
19	VDD	Power supply terminal.(+5V)

 $\mu$ PC1225H(Power amplifier driver)

## NJM4558D-X (Operation amplifier)



## PACKING VIEW



## TX-903

REF.NO.	PART NO.	DESCRIPTION
1	29052330Y	Master carton box <B>
	29052361Y	Master carton box <S>
2	29091440AY	Pad L
3	29091441AY	Pad R
4	29100034A	850×650,Styrene bag
5	282301	Sealing hook
6	29110071	Dampon tape
7	261504	Adhesive tape
8	Accessory bag ass'y	
	29341684AY	Instruction manual <D>
	29341686Y	Instruction manual <P/W/Q/C>
	29100097	350×250,Styrene bag
	292111Y	FM antenna <D/W>
	292112Y	FM antenna <P/Q>
	25065448Y	FM antenna adaptor <W/Q>
	232140	NMA-3057,AM loop antenna
	25055040	CV-K-2,Conversion plug <W>
	29365019A	Warranty card <N>
	29365024A	Warranty card <P>
	29100107	Styrene bag for warranty card <P>
	29358002J	Service station list<N>
	3010165Y	UM-3,Two batteries
	24140223Y	RC-223S,Remote control unit
	2010200	Cord RI

## TX-901

REF.NO.	PART NO.	DESCRIPTION
1	29052333Y	Master carton box <B>
	29052363Y	Master carton box <S>
2	29091440AY	Pad L
3	29091441AY	Pad R
4	29100034A	850×650,Styrene bag
5	282301	Sealing hook
6	29110071	Dampon tape
7	261504	Adhesive tape
8	Accessory bag ass'y	
	29341684AY	Instruction manual <D>
	29341686Y	Instruction manual <P/W/Q/C>
	29100097	350×250,Styrene bag
	292111Y	FM antenna <D/W>
	292112Y	FM antenna <P/Q>
	25065448Y	FM antenna adaptor <W/Q>
	232140	NMA-3057,AM loop antenna
	25055040	CV-K-2,Conversion plug <W>
	29365019A	Warranty card <N>
	29365024A	Warranty card <P>
	29100107	Styrene bag for warranty card <P>
	29358002J	Service station list<N>

NOTE: &lt;B&gt;:Black model only

&lt;S&gt;:Silver model only

&lt;D&gt;:120V model only

&lt;P&gt;:230V model only

&lt;W&gt;:Worldwide model only

&lt;Q&gt;:240V model only

&lt;N&gt;:U.S.A. model only

&lt;F&gt;:French model only

&lt;C&gt;:Canadian model only

## ADJUSTMENT PROCEDURES

### Preparation

#### 1. Input

FM mono: 1kHz, 75kHz devi., 60dB/  $\mu$  V

FM stereo: 1kHz, 75kHz devi., 60dB/  $\mu$  V

Pilot signal 19kHz 7.5kHz devi.

AM: 400Hz 30% mod.

#### 2. Outputs

Connect the non-inductive type resistors of 8 ohms to the speaker terminals A unless otherwise noted.

#### 3. Standard Knob Position

VOLUME.....Maximum

BASS/TREBLE/BALANCE.....Center

MUTING/LOUDNESS.....Off

INPUT SELECTOR.....CD

SPEAKERS.....A

### Confirming Operation

#### 1. Protection circuit

##### a. Speaker relay

The speaker relay turns on after the power switch turned on for 5 minutes.

The speaker relay turns off immediately after the power switch turns off.

##### b. Over-voltage confirmation

The speaker relay is off immediately after DC voltage  $\pm 6V$  is applied to the terminal CD.

### Amplifier section

#### Idling Current Adjustment

Connect the DC voltmeter to the terminals RID(RID) and CT on the power amplifier pc board.

Adjust the semi-fixed resistor R511(R512) so that the indication of voltmeter is  $5 \pm 0.5mV$ .

Note: ( ) : Right channel



POWER AMPLIFIER PC BOARD

SOLDERING SIDE

# PRINTED CIRCUIT BOARD-PARTS LIST

## MODEL TX-903

TUNER CIRCUIT PC BOARD (NARF-4325-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
		Front end			Ceramic filters
TU001	240084	TFFG2U122A<D>	X101,X102	3010071	SFE10.7MA5 <D>
	240085	TFFG4B122A<P/W>	X101	3010081	SFE10.7MS3GYA <P/W>
		ICs	X102	3010137	SFE10.7MMK <P/W>
Q104	22240039	LA1266	X151	3010123	SFZ450JL
Q133	22240090	LM7001	X152	3010076	BFU450C
Q201	22240242	AN7470			Crystal
Q301	222502	NJM4558D-X	X131	3010158	XTL-7.2M
Q324	22240158 or 22240339	LC7823 or LC7823N	RL551	25065339	NRL-2PSADC24-046
Q901	222780126Y	L78OS12			Capacitors
Q902	222780055	78M05HF	C001	354761009	10 $\mu$ F,35V,Elect.
		Transistors	C106	354784799	0.47 $\mu$ F,50V,Elect.
Q101	2211723	2SC1923-O	C107,C108	354742209	22 $\mu$ F,16V,Elect.
Q102	2210746	2SC945A-P <P/W>	C112,C133	354780229	2.2 $\mu$ F,50V,Elect.
Q103,Q132	2211255	2SC1815-GR	C113	354780109	1 $\mu$ F,50V,Elect.
Q131	2212445	2SK365-GR	C131	374722234	0.022 $\mu$ F $\pm$ 5%,50V,Plastic
Q134,Q135	2213510	DTA114ES	C132,C159	374723334	0.033 $\mu$ F $\pm$ 5%,50V,Plastic
Q202,Q555	2211455	2SA1015-GR	C134,C210	353782299	0.22 $\mu$ F,50V,Elect.
Q203,Q204	2212285	2SC2878-A	C138	354721019	100 $\mu$ F,6.3V,Elect.
Q551,Q552	2211255	2SC1815-GR	C154,C554	354780479	4.7 $\mu$ F,50V,Elect.
Q553,Q556	221281	DTC114YS	C155	354741019	100 $\mu$ F,16V,Elect.
Q554	2211255	2SC1815-GR	C156,C157	354761009	10 $\mu$ F,35V,Elect.
Q903	2211455	2SA1015-GR	C160	374721034	0.01 $\mu$ F $\pm$ 5%,50V,Plastic
		Diodes	C161,C208	354780109	1 $\mu$ F,50V,Elect.
D101,D102	223132	1K60	C201	354744719	470 $\mu$ F,16V,Elect.
D103,D105	223163	1SS133	C202	354742209	22 $\mu$ F,16V,Elect.
D131,D201	223163	1SS133	C204,C205	374721824	1800pF $\pm$ 5%,50V,Plastic
D551,D552	223163	1SS133			<D>
D553	224150512	05AZ5.1Y		374721224	1200pF $\pm$ 5%,50V,Plastic
D701	224150683	05AZ6.8Z			<P/W>
D901	22380038	RBV602	C206	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
D902-D906	22380032	1SR139-100	C207	370134714	470pF $\pm$ 5%,100V,Plastic
D907,D908	224151203	05AZ12Z	C209	354780339	3.3 $\mu$ F,50V,Elect.
D909	224152704	05AZ27R	C212,C213	354761009	10 $\mu$ F,35V,Elect.
D910	224150512	05AZ5.1Y	C215,C216	354780229	2.2 $\mu$ F,50V,Elect.
D911	223163	1SS133	C217,C218	374723924	3900pF $\pm$ 5%,50V,Plastic
		Coils	C219	354780229	2.2 $\mu$ F,50V,Elect.
L103	233383	NMC-6070 <P/W>	C301,C302	354780229	2.2 $\mu$ F,50V,Elect.
L104	233409M022	NCH-1272	C307,C308	354721019	100 $\mu$ F,6.3V,Elect.
L201,L202	233294	NMC-5040 <P/W>	C309,C310	374726224	6200pF $\pm$ 5%,50V,Plastic
L551,L552	231176	S-1.3C	C311,C312	374721824	1800pF $\pm$ 5%,50V,Plastic
		Transformers	C313,C314	354780229	2.2 $\mu$ F,50V,Elect.
L101	233401	NFIF-4072	C315,C316	354741019	100 $\mu$ F,16V,Elect.
L102	233402	NFIF-4073	C330	354780229	2.2 $\mu$ F,50V,Elect.
L152	232139	NMIF-4062	C551,C552	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
		RF block	C555	354722219	220 $\mu$ F,6.3V,Elect.
L151	232152	NMRR-7052	C563	354780479	0.47 $\mu$ F,50V,Elect.
			C905,C906	3504207	6800 $\mu$ F,50V,Elect.

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
		Capacitors			Diodes
C907,C908	354742219	220 $\mu$ F,16V,Elect.	D702	224150913	05AZ9.1Z
C910	354783309	33 $\mu$ F,30V,Elect.	D703	224150562	05AZ5.6Y
C911	354752229	2200 $\mu$ F,25V,Elect.	D704	225142	SEL2913K,L.E.D.
C913-C915	354761009	10 $\mu$ F,35V,Elect.	D705-D707	223163	1SS133
C917,C918	354781009	10 $\mu$ F,50V,Elect.	D709-D724	223163	1SS133
		Resistors	D726	223163	1SS133 <D>
R101	5210221 or 5210070	N06HR100KBD Semi-fixed	L701	233400M220 or 233409K220	NCH-2238 or NCH-1284
R201	5210216 or 5210062	N06HR5KBD or N06HR4.7KBD ,Semi-fixed			Capacitors
R202	5210222 or 5210072	N06HR200KBD or N06HR220KBD,Semi-fixed	C701	3000057	0.1F,5.5V,Super
R559,R560	442520824	8.2ohm,1/2W,Metal oxide film	C702,C704	375524744	0.47 $\mu$ F $\pm$ 5%,50V,Plastic
R902,R903	441721024	1kohm,2W,Metal oxide film	C703	353780229	2.2 $\mu$ F,50V,Elect.
R904	442520104	1ohm,1/2W,Metal oxide film	C705	353744709	47 $\mu$ F,16V,Elect.
R905	441723904	39ohm,2W,Metal oxide film	C706	353780109	1 $\mu$ F,50V,Elect.
R906	442521004	10ohm,1/2W,Metal oxide film	R710	49163103404	10kohm $\times$ 4,1/10W,Array
		Terminals			Switches
P001	25060157Y	NTM-4PDML083,Antenna <D>	S701-S727	25035548	NPS-111-S510
	25060117Y	NTM-2PDML051,Antenna <P/W>	S728	25065286	NSS22112,Band <W>
P101	25060064	4P-5			Holders
P102	25060061	1P-5		27190810Y	FL
P301,P302	25045323Y	NPJ-6PDML180		27190811Y	LBD
P303	25045172	HSJ1003-01-020			
P551	25060158Y	NTM-8PDML084,Speaker			POWER AMPLIFIER CIRCUIT PC BOARD(NAAF-4327-1/1A)
		Sockets	CIRCUIT NO.	PART NO.	DESCRIPTION
P310,P901	25050267	NSCT-3P95			ICs
		Radiators	Q501,Q502	22240108	$\mu$ PC1225H
	27160145	RAD-51	Q517	222502	NJM4558D-X
	27160166				Transistors
	27160176	RAD-56	Q503,Q504	2202282, 2202283,	* 2SA1265N-R, * 2SA1265N-O,
				2201693	* 2SA1491-O,
				2201694 or	* 2SA1491-Y or
				2201696	* 2SA1491-P
			Q505,Q506	2202292, 2202293,	* 2SC3182N-R, * 2SC3182N-O,
U701	24130003	GP1U50XS		2201703	* 2SC3855-O,
		ICs		2201704 or	* 2SC3855-Y or
Q701	22240406Y	$\mu$ PD75268CW-025		2201706	* 2SC3855-P
Q703	22240376	$\mu$ PD17103CX-528	Q507-Q510	2211255	2SC1815-GR
		FL tube	Q511,Q512	2212600	DTA124ES
Q702	212093Y	FIP9BTM8	Q513,Q514	2212285	2SC2878-A
		Transistors	Q515	2211455	2SA1015-GR
Q704	221282	DTC144ES	Q516	221282	DTC144ES
Q705	2212600	DTA124ES			
		Ceramic oscillators			
X701	3010163	CST4.19MGW			
X702	3010154	CST8.00MT			

## AC OUTLET PC BOARD(NAETC-4333-1/1A)

(230V and Worldwide models)

CIRCUIT NO.	PART NO.	DESCRIPTION
		Capacitors
C501,C502	354761009	10 $\mu$ F,35V,Elect.
C505,C506	354741019	100 $\mu$ F,16V,Elect.
C507,C508	374723334	0.033 $\mu$ F $\pm$ 5%,50V,Plastic
C515,C516	354780229	2.2 $\mu$ F,50V,Elect.
C517	353761009	10 $\mu$ F,35V,Elect.
CS25-C528	354761009	10 $\mu$ F,35V,Elect.
		Resistors
R511,R512	5215061	N08HR3KBC,Semi-fixed
R526,R527	442521004	10ohm,1/2W,Metal oxide film
R531-R534	4500005	0.22ohm,2W,Metal plate
		Radiators
	27160306Y	
		Plugs
P503,P504	25055495	NPLG-2P470

## TONE CONTROL CIRCUIT PC BOARD (NAAF-4334-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
		ICs
Q401,Q402	222502	NJM4558D-X
		Capacitors
C401,C402	354761009	10 $\mu$ F,35V,Elect.
C407,C408	354761009	10 $\mu$ F,35V,Elect.
C409,C410	374722234	0.022 $\mu$ F $\pm$ 5%,50V,Plastic
C411,C412	354780339	3.3 $\mu$ F,50V,Elect.
C413,C414	374722234	0.022 $\mu$ F $\pm$ 5%,50V,Plastic
C417,C418	354741019	100 $\mu$ F,16V,Elect.
		Resistors
R405,R406	5104225	N11RQLC250KWT22Z,Balance
R417,R421	5104230	N14RLC100KWT22Z,Tone
R418,R422		

## VOLUME CONTROL PC BOARD(NAETC-4335-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q451	22240322	LB1639,IC
C453,C454	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic capacitors
C473	354741019	100 $\mu$ F,16V,Elect. capacitor
R459,R460	5104243	N16RGM100KBTP25F, Volume,Variable resistor
P451	25050267	NSCT-3P95,Socket
P452	25050268	NSCT-4P96,Socket
S451	25035609	NPS-122-L571,Switch

## VOLTAGE SELECTOR SWITCH PC BOARD (NASW-4338-1)

(Only Worldwide model)

CIRCUIT NO.	PART NO.	DESCRIPTION
S902	25065287	NSS-22113P,Slide switch

NOTE:&lt;D&gt;:Only 120V model

&lt;P&gt;:Only 230V and 240V models

&lt;W&gt;:Only Worldwide model

CAUTION:Replacement for transistor of mark \*,if necessary,  
must be made from the same beta group (H <sub>FE</sub>) as  
the original type.

## AC OUTLET PC BOARD(NAETC-4332-1)

(Only 120V model)

CIRCUIT NO.	PART NO.	DESCRIPTION
P951	25050409	NSCT-4P234,AC outlet

NOTE: THE COMPONENTS IDENTIFIED BY MARK **▲**  
ARE CRITICAL FOR RISK OF FIRE AND  
ELECTRIC SHOCK. REPLACE ONLY WITH  
PART NUMBER SPECIFIED.

## PRINTED CIRCUIT BOARD-PARTS LIST

## MODEL TX-901

## TUNER CIRCUIT PC BOARD (NARF-4325-2/2A/2B)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end			Ceramic filters	
TU001	240084	TFPG2U122A<D>	X101,X102	3010071	SFE10.7MA5 <D>
	240085	TFPG4E122A<P/W>	X101	3010081	SFE10.7MS3GYA <P/W>
	ICs		X102	3010137	SFE10.7MMK <P/W>
Q104	22240039	LA1266	X151	3010123	SPZ450UL
Q133	22240090	LM7001	X152	3010076	BFU450C
Q201	22240242	AN7470		Crystal	
Q301	222502	NJM4558D-X	X131	3010158	XTL-7.2M
Q324	→ 22240158 or	LC7823 or		Relay	
	22240339	LC7823N	RL551	25065339	NRL-2P5ADC24-046
Q902	222780055	78M05HF		Capacitors	
Q905	222780125	78M12HF	C001	354761009	10 $\mu$ F,35V,Elect.
	Transistors		C106	354784799	0.47 $\mu$ F,50V,Elect.
Q101	2211723	2SC1923-O	C107	354742209	22 $\mu$ F,16V,Elect.
Q102	2210746	2SC945A-P <P/W>	C108	354741019	100 $\mu$ F,16V,Elect.
Q103,Q132	2211255	2SC1815-GR	C112,C133	354780229	2.2 $\mu$ F,50V,Elect.
Q131	2212445	2SK365-GR	C113	354780109	1 $\mu$ F,50V,Elect.
Q134,Q135	2213510	DTA114ES	C131	374722234	0.022 $\mu$ F $\pm$ 5%,50V,Plastic
Q202,Q555	2211455	2SA1015-GR	C132,C159	374723334	0.033 $\mu$ F $\pm$ 5%,50V,Plastic
Q203,Q204	2212285	2SC2878-A	C134,C210	353782299	0.22 $\mu$ F,50V,Elect.
Q551,Q552	2211255	2SC1815-GR	C138	354721019	100 $\mu$ F,6.3V,Elect.
Q553	221281	DTC114YS	C154,C554	354780479	4.7 $\mu$ F,50V,Elect.
Q554	2211255	2SC1815-GR	C155	354741019	100 $\mu$ F,16V,Elect.
Q903	2211455	2SA1015-GR	C156,C157	354761009	10 $\mu$ F,35V,Elect.
	Diodes		C160	374721034	0.01 $\mu$ F $\pm$ 5%,50V,Plastic
D101,D102	223132	1K60	C161,C208	354780109	1 $\mu$ F,50V,Elect.
D103,D105	223163	1SS133	C201	354744719	470 $\mu$ F,16V,Elect.
D131,D201	223163	1SS133	C202	354742209	22 $\mu$ F,16V,Elect.
D551	223163	1SS133	C204,C205	374721824	1800pF $\pm$ 5%,50V,Plastic
D553	224150512	05AZ5.1Y			<D>
D701	224150683	05AZ6.8Z			1200pF $\pm$ 5%,50V,Plastic
D901	22380023	RBV401			<P/W>
D902-D906	22380032	1SR139-100	C206	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
D907,D908	224151203	05AZ12Z	C207	370134714	470pF $\pm$ 5%,100V,Plastic
D909	224152704	05AZ27R	C209	354780339	3.3 $\mu$ F,50V,Elect.
D910	224150512	05AZ5.1Y	C212,C213	354761009	10 $\mu$ F,35V,Elect.
D911	223163	1SS133	C215,C216	354780229	2.2 $\mu$ F,50V,Elect.
	Coils		C217,C218	374723924	3900pF $\pm$ 5%,50V,Plastic
L103	233383	NMC-6070 <P/W>	C219	354780229	2.2 $\mu$ F,50V,Elect.
L104	233409M022	NCH-1272	C301,C302	354780229	2.2 $\mu$ F,50V,Elect.
L201,L202	233294	NMC-5040 <P/W>	C307,C308	354721019	100 $\mu$ F,6.3V,Elect.
L551,L552	231176	S-1.3C	C309,C310	374726224	6200pF $\pm$ 5%,50V,Plastic
	Transformers		C311,C312	374721824	1800pF $\pm$ 5%,50V,Plastic
L101	233401	NFIF-4072	C313,C314	354780229	2.2 $\mu$ F,50V,Elect.
L102	233402	NFIF-4073	C315,C316	354741019	100 $\mu$ F,16V,Elect.
L152	232139	NMIF-4062	C330	354780229	2.2 $\mu$ F,50V,Elect.
	RF block		C551,C552	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
L151	232152	NMRF-7052	C555	354722219	220 $\mu$ F,6.3V,Elect.
			C905,C906	3504207	6800 $\mu$ F,50V,Elect.

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors			Capacitors	
C907,C908	354742219	220 $\mu$ F,16V,Elect.	C701	3000057	0.1F,5.5V,Super
C910	354783309	33 $\mu$ F,50V,Elect.	C702,C704	375524744	0.47 $\mu$ F $\pm$ 5%,50V,Plastic
C911	354752229	2200 $\mu$ F,25V,Elect.	C703	353780229	2.2 $\mu$ F,50V,Elect.
C913-C915	354761009	10 $\mu$ F,35V,Elect.		Resistor	
C917,C918	354781009	10 $\mu$ F,50V,Elect.	R710	49163103404	10kohm $\times$ 4.1/10W,Array
	Resistors			Switches	
R101	5210221 or	N06HR100KBD	S701-S727	25035548	NPS-111-S510
	5210070	Semi-fixed	S728	25065286	NSS22112,Band <W>
R201	5210216 or	N06HR5KBD or		Holder	
	5210062	N06HR4.7KBD,Semi-fixed		27190810Y	FL
R202	5210222 or	N06HR200KBD or			
	5210072	N06HR220KBD,Semi-fixed			
RS59,R560	442520824	8.2ohm,1/2W,Metal oxide film			
R902,R903	441729114	910ohm,2W,Metal oxide film			
R904	442520104	1ohm,1/2W,Metal oxide film	Q501,Q502	22240108	$\mu$ PC1225H
R905	441726804	68ohm,2W,Metal oxide film	Q517	222502	NJM4558D-X
R906	442521004	10ohm,1/2W,Metal oxide film		Transistors	
R910	441622704	27ohm,1W,Metal oxide film	Q503,Q504	2202492,	* 2SA1264N-R,
	Terminals			2202493,	* 2SA1264N-O,
P001	25060157Y	NTM-4PDML083,Antenna <D>		2202243	* 2SA1694-O,
	25060117Y	NTM-2PDML051,Antenna <P/W>		2202244 or	* 2SA1694-Y or
P101	25060064	4P-S		2202246	* 2SA1694-P
P102	25060061	1P-S	Q505,Q506	2202502,	* 2SC3181N-R,
P301,P302	25045323Y	NPJ-6PDML180		2202503,	* 2SC3181N-O,
P551	25060158Y	NTM-8PDML084,Speaker		2202253	* 2SC4467-O,
	Sockets			2202254 or	* 2SC4467-Y or
P310,P901	25050267	NSCT-3P95		2202256	* 2SC4467-P
			Q507-Q510	2211255	2SC1815-GR
			Q513,Q514	2212285	2SC2878-A
			Q515	2211455	2SA1015-GR
	IC			Capacitors	
Q701	22240406Y	$\mu$ PD75268CW-025	CS01,CS02	354761009	10 $\mu$ F,35V,Elect.
	FL tube		CS05,CS06	354741019	100 $\mu$ F,16V,Elect.
Q702	212093Y	FIP9BTM8	CS07,CS08	374723334	0.033 $\mu$ F $\pm$ 5%,50V,Plastic
	Transistor		CS15,CS16	354780229	2.2 $\mu$ F,50V,Elect.
Q704	221282	DTC144ES	CS17	353761009	10 $\mu$ F,35V,Elect.
	Ceramic oscillator		CS25-CS28	354761009	10 $\mu$ F,35V,Elect.
X701	3010163	CST4.19MOW		Resistors	
	Diodes		R511,R512	5215061	N06HR3KBC,Semi-fixed
D702	224150913	05AZ9.1Z	R526,R527	442521004	10ohm,1/2W,Metal oxide film
D705-D707	223163	ISS133	R531-R534	4500005	0.22ohm,2W,Metal plate
D709-D711	223163	ISS133		Radiators	
D713-D720	223163	ISS133		27160273Y	
	Coil			Plugs	
L701	233400M220 or	NCH-2238 or	P503,P504	25055495	NPLG-2P470
	233409K220	NCH-1284			

CAUTION: Replacement for transistor of mark \* if necessary, must be made from the same beta group (H  $\beta$ ) as the original type.

NOTE: THE COMPONENTS IDENTIFIED BY MARK  $\Delta$  ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

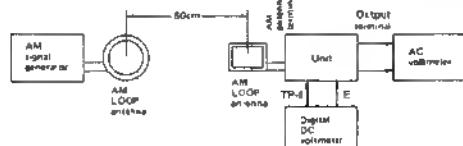
## FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuned frequency	Output indicator	Adjustment point	Adjust for	Remarks
1 F	1	Fig. 1	99.1MHz 1kHz, 5kHz devi. 65dB (60dB)		99.1MHz	DC voltmeter	L101	$0 \pm 20mV$	Set the FM mode switch to MONO. Repeat the steps 1 and 2 until no further adjustment is necessary.
	2					Distortion analyzer	L102	Minimum	
VCO		Fig. 2	99.1MHz 1kHz, 5kHz devi. 65dB (60dB)		99.1MHz	Frequency counter	R201	$19kHz \pm 10Hz$	Set the FM mode switch to AUTO.
Stereo distortion		Fig. 3	99.1MHz Ext. modulation 65dB (60dB)	L+R 1kHz 6.5kHz devi.	99.1MHz	Distortion analyzer	IF on front end	Minimum	
Stereo separation	1	Fig. 3	99.1MHz Ext. modulation 65dB (60dB)	Lch. 1kHz	99.1MHz	Rch. AC voltmeter	R202	Minimum	Maximum and same separation
	2			Rch. 1kHz		Rch. AC voltmeter		Minimum	
Tuned indicator level	1	Fig. 3	99.1MHz 1kHz, 5kHz devi. 19.2dB (14dB) (20V model) 12dB (other models)		99.1MHz	TUNED indicator	R101	Light on	
	2		99.1MHz 1kHz, 5kHz devi. 18.2dB (13dB) 11dB (other models)					Light off	

## AM section

Step	AM SG output	Tuned Frequency	Output indicator	Adjustment point	Adjust for
1		522kHz (530kHz) (531kHz)	Digital DC voltmeter	OSC coil on RF block (L151)	$1.5V \pm 0.1V$
2	603kHz 60dB/m (600kHz) 400Hz 30% mod.	603kHz (600kHz)	A C voltmeter	RF coil on RF block (L151)	Maximum
3	990kHz, 60dB/m 400Hz 30% mod.	990kHz	A C voltmeter	L152	Maximum

Note: ( ) : 20V model (10kHz step)  
( ) : Worldwide model

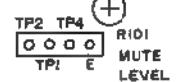
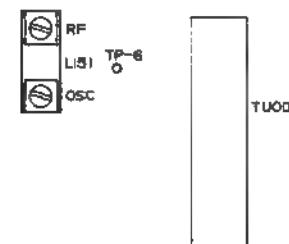
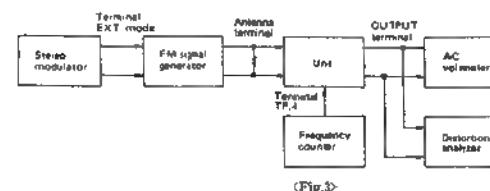
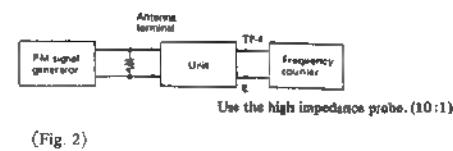
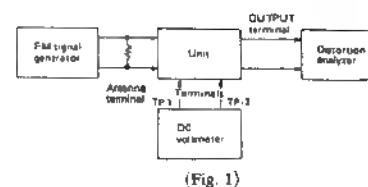


## Reference specifications

Tuned voltage	AM 530kHz (U.S.A. model)	$1.5 \pm 0.4V$
(Connect Digital	522kHz (European model)	$1.5 \pm 0.4V$
DC voltmeter to	1710kHz (U.S.A. model)	$8.0 \pm 0.5V$
test point TP-6)	1611kHz (European model)	$7.5 \pm 0.5V$
FM	87.9MHz (U.S.A. model)	$2.0 \pm 0.5V$
	87.5MHz (European model)	$2.0 \pm 0.5V$
	107.9MHz (U.S.A. model)	$7.5 \pm 0.5V$
	108.0MHz (European model)	$7.5 \pm 0.5V$

Muting width  $35 \pm 10kHz$   
Muting level (U.S.A. model) FM  $14 \pm 3dB$   
(European model) FM  $12 \pm 3dB$

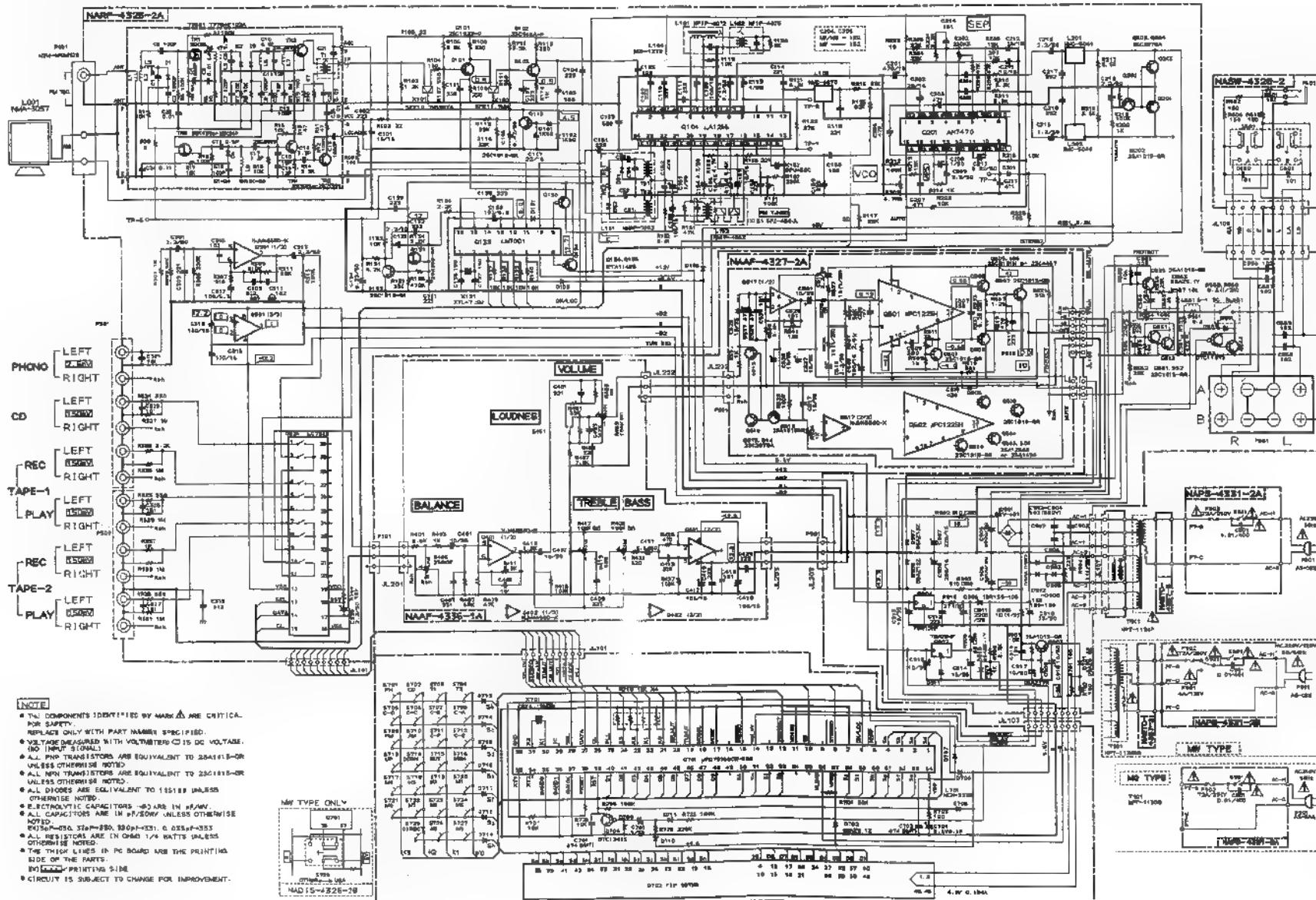
Auto stop level AM Less than 6dB/m  
FM Less than 20dB $\mu$



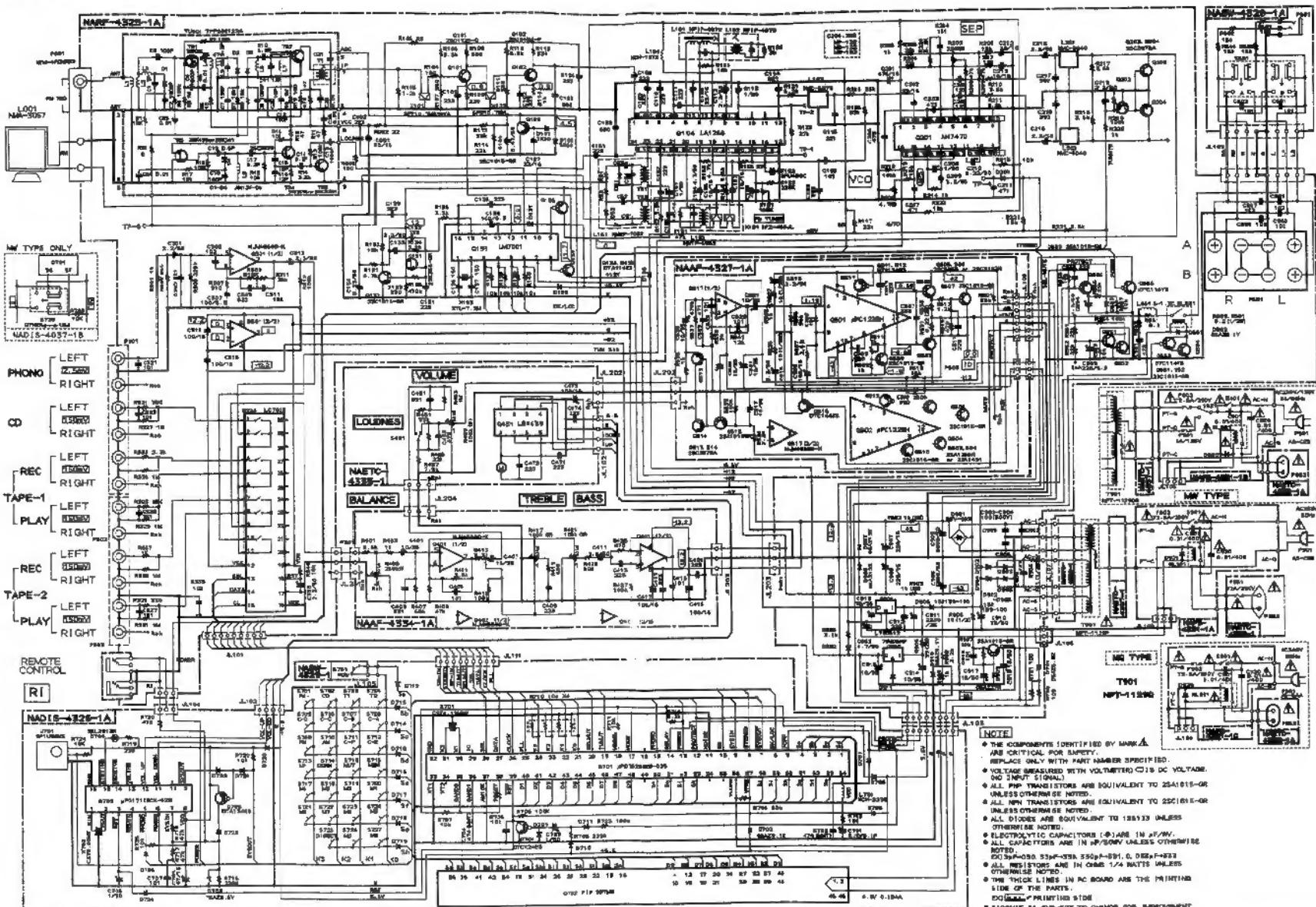
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## **SCHEMATIC DIAGRAM**

**MODEL TX-901 (Other models)**



**SCHEMATIC DIAGRAM**  
MODEL TX-903 (Other models)



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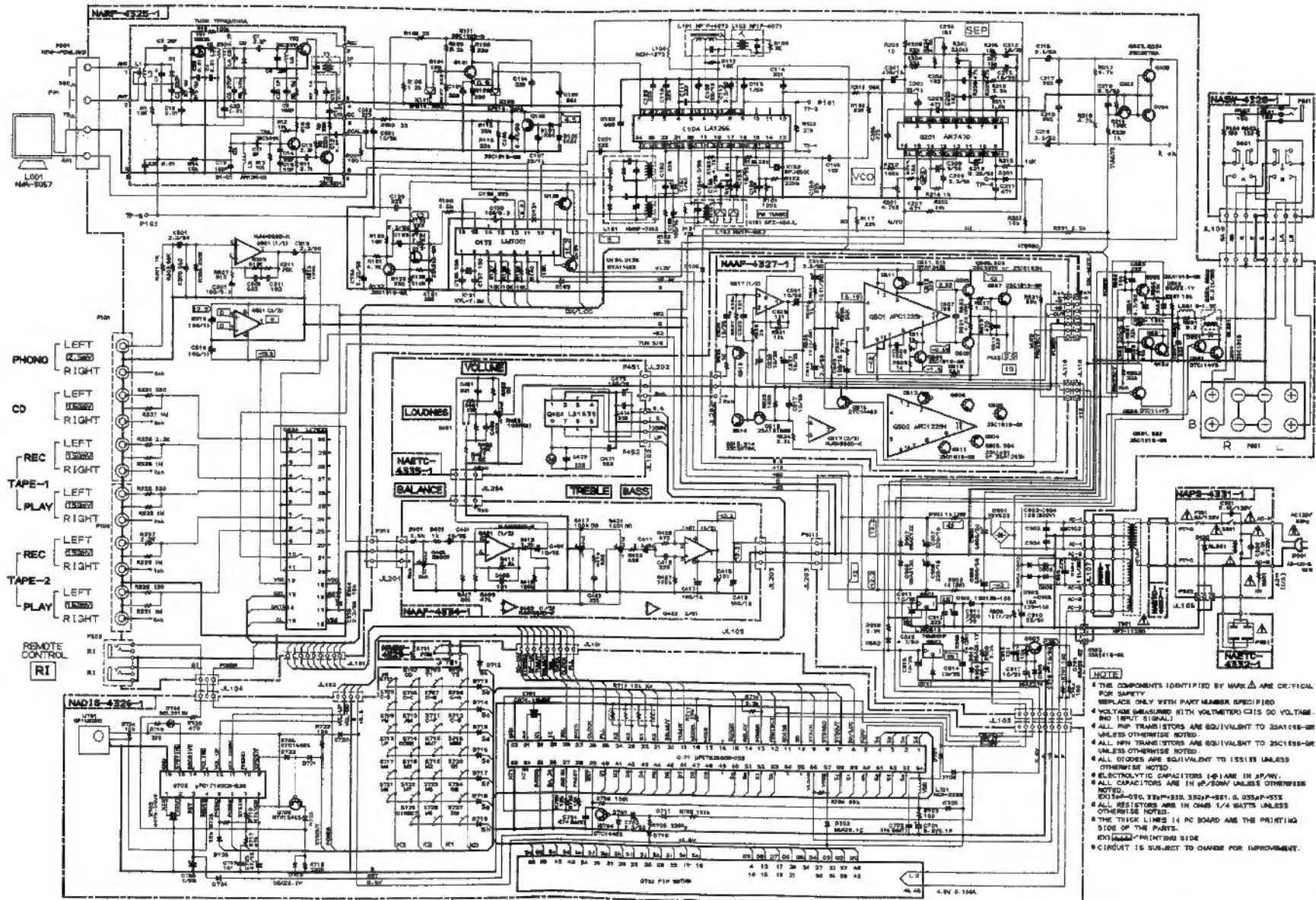
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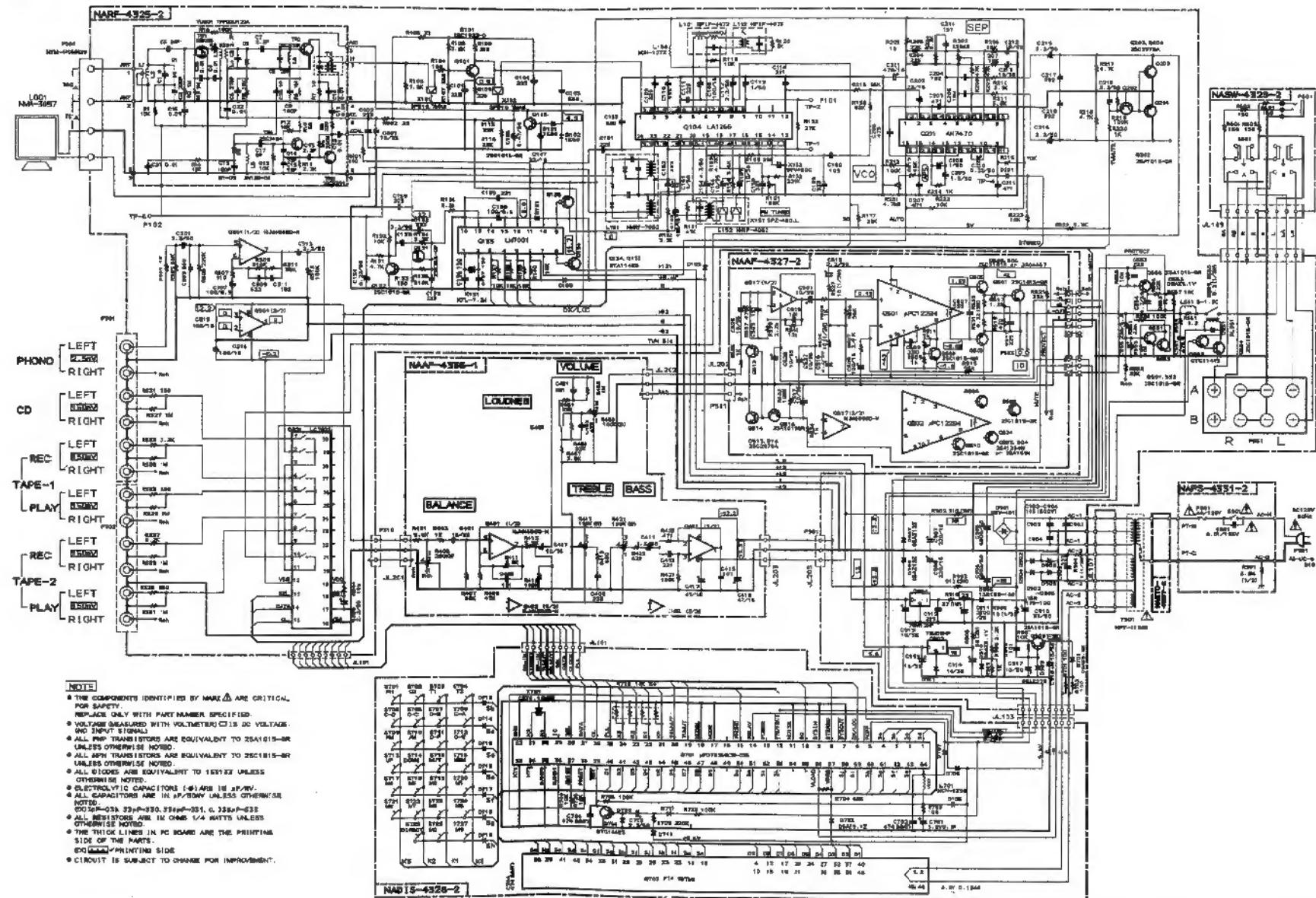
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**SCHEMATIC DIAGRAM**  
MODEL TX-903 (120V model)

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## SCHEMATIC DIAGRAM MODEL TX-901 (120V model)



## HEADPHONE TERMINAL PC BOARD(NASW-4328-2/2A)

CIRCUIT NO.	PART NO.	DESCRIPTION
S601	25035517	NPS-222-L479,Speaker switch
P601	25045255	YKB21-5009,Headphone terminal

## POWER SUPPLY CIRCUIT PC BOARD(NAPS-4331-2/2A/2B/2C)

CIRCUIT NO.	PART NO.	DESCRIPTION
S901	25035550	▲ NPS-111-L512P,Push switch
R901	431523355	▲ 3.3Mohm,1/2W,Solid resistor <D>
C901	3500065A	▲ DE7150FZ103PAC400V/125V IS capacitor
F901	252049	▲ 4A(ST-6),Fuse <D/W>
F902	252074	▲ 2A-SE-EAK,Fuse <P/W>
F901a	250113	▲ SNS051,Fuseholder <D/W>
F902a	25050065	▲ YSH-403T,Fuseholder <P/W>
	29360626-1	Fuse label <D>

## TONE CONTROL CIRCUIT PC BOARD (NAAF-4336-2/2A)

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q401,Q402	222502	NJM4558D-X
Capacitors		
C401,C402	354761009	10 $\mu$ F,35V,Elect.
C407,C408	354761009	10 $\mu$ F,35V,Elect.
C409,C410	374722234	0.022 $\mu$ F $\pm$ 5%,50V,Plastic
C411,C412	354780339	3.3 $\mu$ F,50V,Elect.
C413,C414	374722234	0.022 $\mu$ F $\pm$ 5%,50V,Plastic
C417,C418	354744709	47 $\mu$ F,16V,Elect.
C453,C454	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
Resistors		
R405,R406	5104228	N11RGHC250KWT22Z,Balance
R417,R421	5104229	N14RHC100KWT22Z,Tone
R418,R422		
R459,R460	5142001	N16RGP100KBTP25,Volume
Switch		
S451	25035611	NPS-i22-L573

## VOLTAGE SELECTOR SWITCH PC BOARD (NASW-4338-2)

(Only Worldwide model)

CIRCUIT NO.	PART NO.	DESCRIPTION
S902	25065287	▲ NSS-22113P,Slide switch

NOTE:&lt;D&gt;:Only 120V model

&lt;P&gt;:Only 230V and 240V models

&lt;W&gt;:Only Worldwide model

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